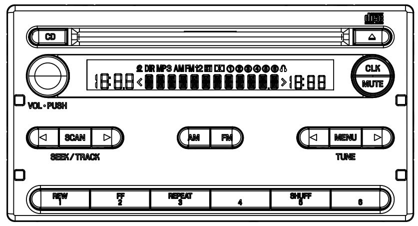
Pioneer sound.vision.soul

Service Manual

FORD



DEH-2237ZF/X1R/UC

ORDER NO.
CRT3094

DISC PLAYER WITH AMPLIFIER

DEH-2237ZF X1R/UC

VEHICLE	DESTINATION	PRODUCED AFTER	FORD PART No.	ID No.	PIONEER MODEL No.
Ranger	U.S.A., CANADA	August 2003	FS-4L5T-18C868-AE	——	DEH-2237ZF/X1R/UC

● This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
CX-977	CRT2624	S9	CD Mech. Module:Circuit Description, Mech.Description, Disassembly

For details, refer to "Important symbols for good services".

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE NV Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZD. JUNE 2003 Printed in Japan

[Important symbols for good services]
In this manual, the symbols shown-below indicate that adjustments, settings or cleaning should be made securely.
When you find the procedures bearing any of the symbols, be sure to fulfill them:

1. Product safety

You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.

2. Adjustments

To keep the original performances of the product, optimum adjustments or specification confirmation is indispensable. In accordance with the procedures or instructions described in this manual, adjustments should be performed.

3. Cleaning

For optical pickups, tape-deck heads, lenses and mirrors used in projection monitors, and other parts requiring cleaning, proper cleaning should be performed to restore their performances.

4. Shipping mode and shipping screws

To protect the product from damages or failures that may be caused during transit, the shipping mode should be set or the shipping screws should be installed before shipping out in accordance with this manual, if necessary.

5. Lubricants, glues, and replacement parts

Appropriately applying grease or glue can maintain the product performances. But improper lubrication or applying glue may lead to failures or troubles in the product. By following the instructions in this manual, be sure to apply the prescribed grease or glue to proper portions by the appropriate amount.For replacement parts or tools, the prescribed ones should be used.

● CD section precaution

1. Before disassembling the unit, be sure to turn off the power. Unplugging and plugging the connectors during power-on mode may damage the ICs inside the unit.
2. To protect the pickup unit from electrostatic discharge during servicing, take an appropriate treatment (shorting-solder) by referring to “the DISASSEMBLY” on page 46.
3. After replacing the pickup unit, be sure to check the grating. (See p.40.)

SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

CONTENTS

COMPACT disc DIGITAL AUDIO

1. SPECIFICATIONS

General

Power source .... 14.4V DC(10.5V-16.0V allowable)
Grounding system .... Negative type
Backup current .... 3mA or less
Dimensions .... 188(W) x100(H) x187(D)mm
Weight 2.0kg

CD player

System .... Compact disc audio system
Usable discs .... Compact disc
Signal format .... Sampling frequency : 44.1kHz
Number of quantization bits: 16;linear
S/N .... 70dB or more
Distortion .... 0.1% or less

FM tuner

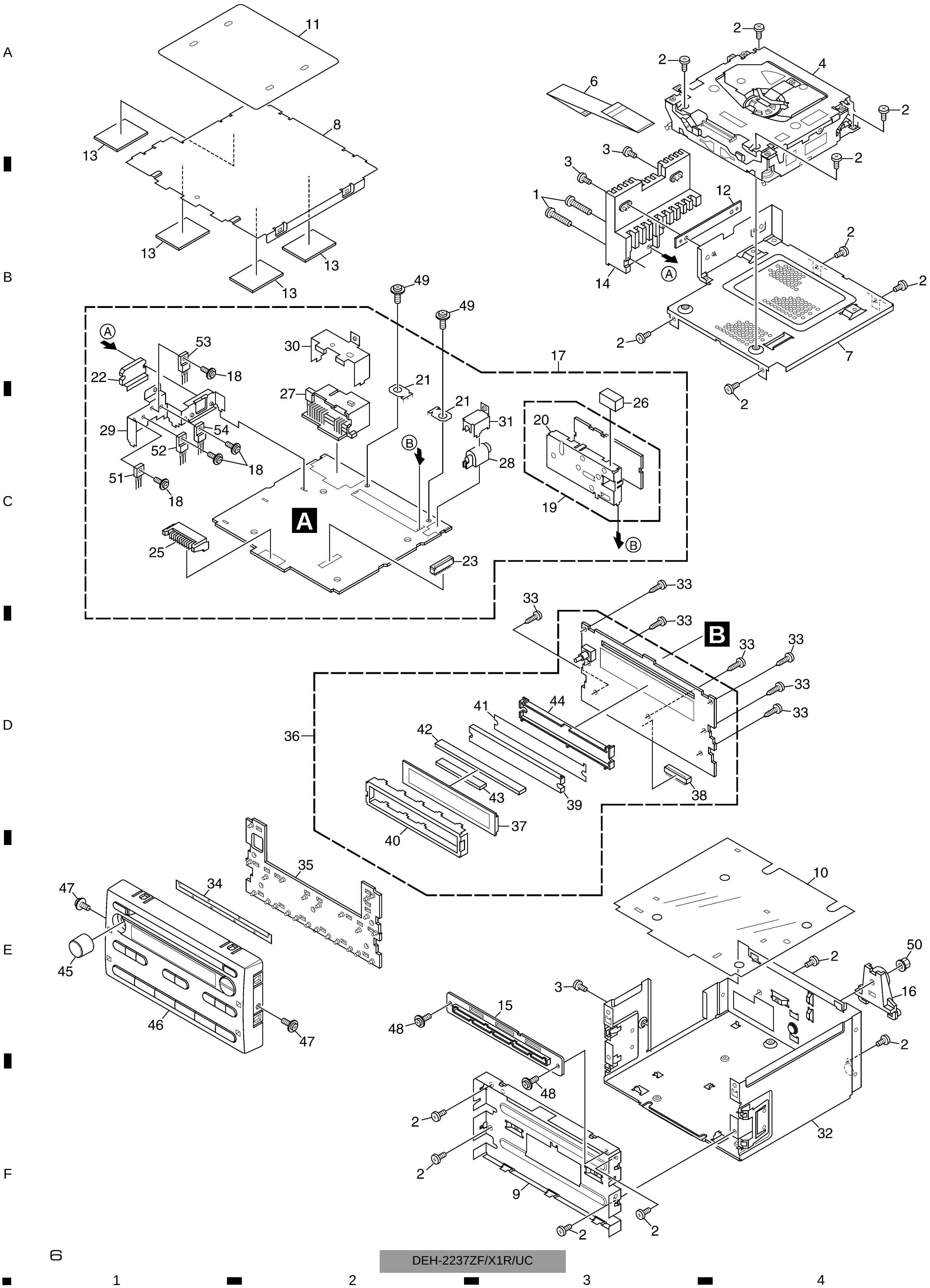
Frequency .... 87.75, 87.9-107.9 MHz
S/N .... 58dB or more
Distortion .... 1.0% or less
IF interference .... 95dB or more
Image interference .... 45dB or more
Stereo Separation .... 25dB or more(400Hz)

AM tuner

Frequency .... 530-1710 kHz
S/N 20dB useable sensibility .... 33dBμ +4dB, -5dB
S/N .... 50dB +10dB, -6dB
Distortion .... 1.5% or less
IF interference .... 75dB or more
Image interference .... 60dB or more

2. EXPLODED VIEWS AND PARTS LIST

2.1 EXTERIOR



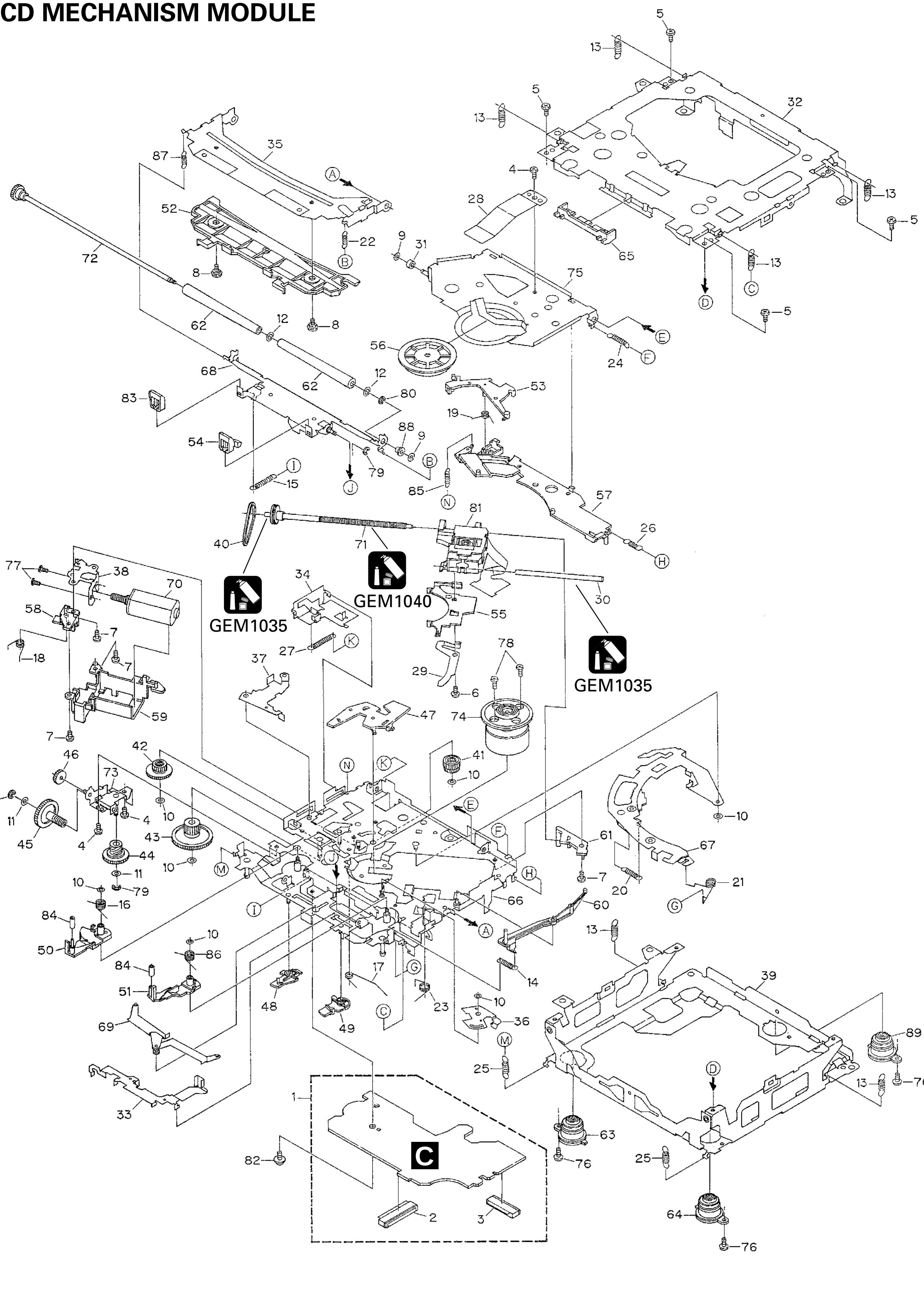
NOTE:

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.
- For the applying amount of lubricants or glue, follow the instructions in this manual.
  (In the case of no amount instructions, apply as you think it appropriate.)

● EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BMZ26P200FMC
	2	Screw	BSZ26P060FMC
	3	Screw	BSZ26P080FZK
	4	CD Mechanism Module(S9V)	CXK5525
	5	•••••	
	6	Connector	HDE0043
	7	Chassis	HNA0012
	8	Case	HNB0166
	9	Holder	HNC0121
	10	Insulator	HNM0092
	11	Seal	HNM0115
	12	Insulator	HNM0116
*	13	Insulator	HNM5230
	14	Heat Sink	HNR0242
	15	Holder	HNV0048
	16	Rail Guide	HNV6756
	17	Mother Unit	HWM0086
	18	Screw	ASZ26P080FMC
	19	FM/AM Tuner Unit	CWE1561
	20	Holder	CNC8855
	21	Terminal(CN401,402)	CKF1059
	22	IC(IC201)	TDA7384
*	23	Connector(CN607)	CKS2251
	24	•••••	
	25	Connector(CN604)	CKS4575
	26	Cushion	CNM6825
	27	Plug(CN601)	HKM1372
	28	Antenna Jack(CN602)	HKX1054
	29	Holder	HNC0119
	30	Holder	HNC0120
	31	Holder	HNC0125
	32	Chassis Unit	HXA0379
	33	Screw	BPZ26P080FMC
	34	Cover	HNM7654
	35	Rubber	HNV7063
	36	Keyboard Unit	HWM0087
	37	LCD(LCD904)	CAW1822
	38	Connector(CN901)	CKS4576
	39	Lighting Conductor	CNV7936
	40	Holder	HNC9816
	41	Sheet	HNM0103
	42	Connector	HNV0049
	43	Connector	HNV0050
	44	Housing	HNV7069
	45	Knob Assy	HXA0385
	46	Grille Unit	HXA0420
	47	Screw	IMS20P040FZK
	48	Screw	IMS26P040FMC
	49	Screw	ISS26P055FUC
	50	Nut	NF50FMC
	51	Transistor(Q824)	KSA1220
	52	Transistor(Q700)	KSD1273
	53	Transistor(Q821)	2SB942A
	54	Transistor(Q805)	KSB1366

2.2 CD MECHANISM MODULE

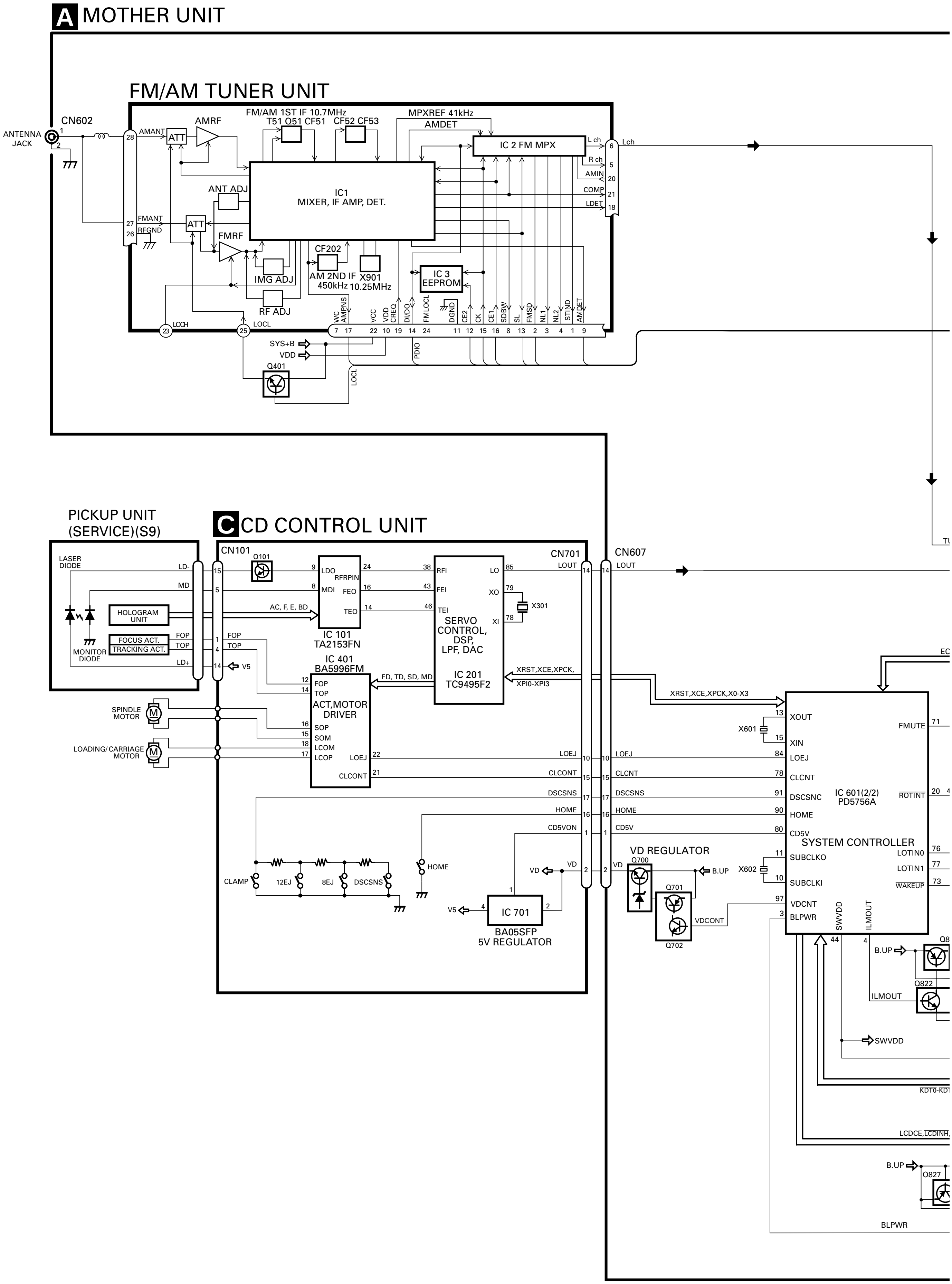


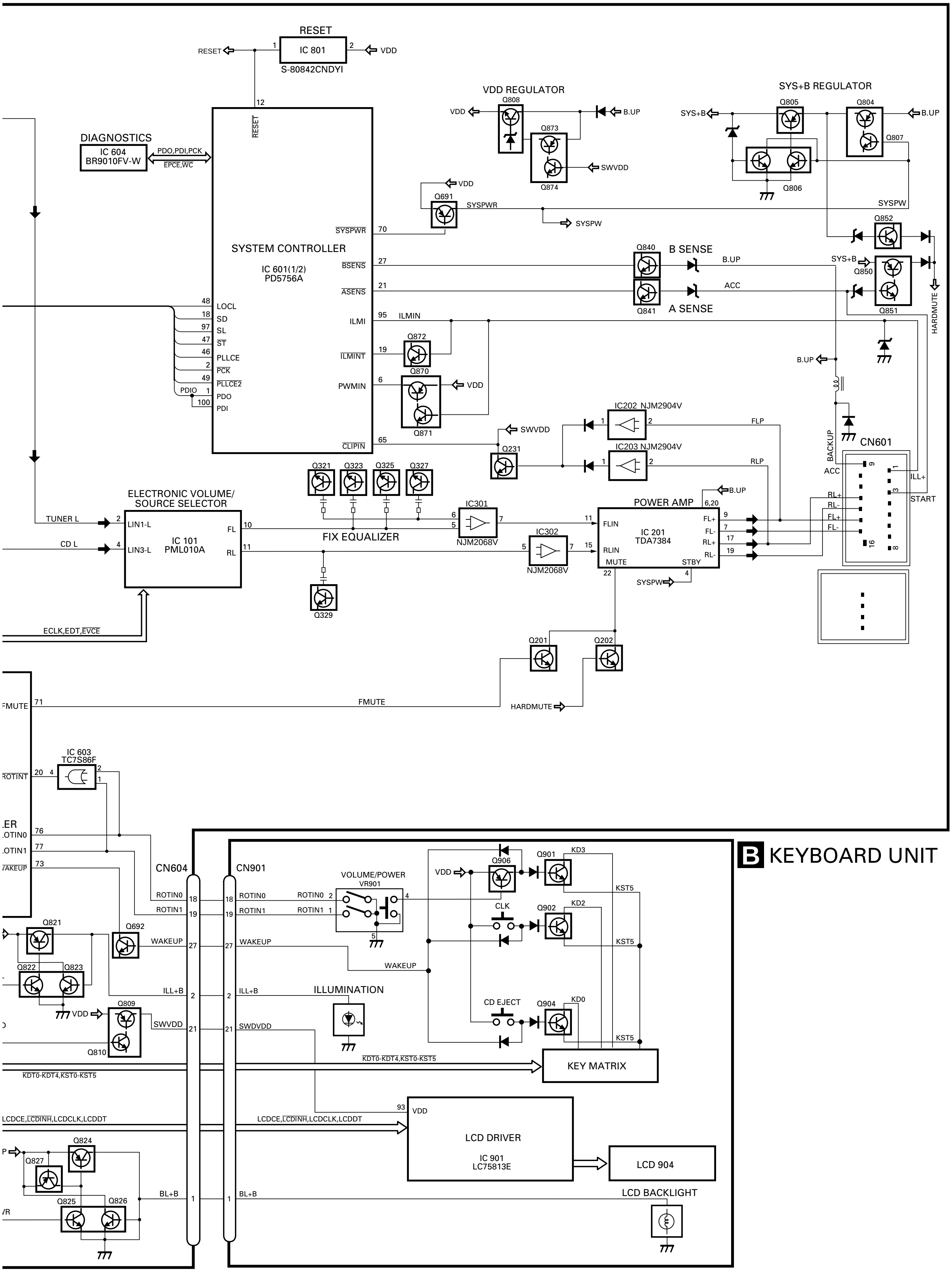
● CD MECHANISM MODULE SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	CD Control Unit	CWX2701
	2	Connector(CN701)	CKS1959
	3	Connector(CN101)	CKS3486
	4	Screw	BMZ20P025FTC
	5	Screw	BSZ20P040FTC
	6	Screw(M2x4)	CBA1362
	7	Screw(M2x3)	CBA1527
	8	Screw	CBA1545
	9	Washer	CBF1037
	10	Washer	CBF1038
	11	Washer	CBF1039
	12	Washer	CBF1060
	13	Spring	CBH2378
	14	Spring	CBH2379
	15	Spring	CBH2514
	16	Spring	CBH2533
	17	Spring	CBH2382
	18	Spring	CBH2383
	19	Spring	CBH2384
	20	Spring	CBH2527
	21	Spring	CBH2386
	22	Spring	CBH2537
	23	Spring	CBH2390
	24	Spring	CBH2391
	25	Spring	CBH2523
	26	Spring	CBH2426
	27	Spring	CBH2444
	28	Spring	CBL1561
	29	Spring	CBL1553
	30	Shaft	CLA3845
	31	Roller	CLA3910
	32	Frame	CNC9654
	33	Lever	CNC9664
	34	Lever	CNC8949
	35	Arm	CNC9661
	36	Arm	CNC9016
	37	Arm	CNC9017
	38	Bracket	CNC9123
	39	Frame	CNC8947
	40	Belt	CNT1086
	41	Gear	CNV6886
	42	Gear	CNV6316
	43	Gear	CNV6317
	44	Gear	CNV6318
	45	Gear	CNV6319
	46	Gear	CNV6320
	47	Arm	CNV6322
	48	Arm	CNV6323
	49	Arm	CNV6324
	50	Arm	CNV6888
	51	Arm	CNV6889
	52	Guide	CNV6327
	53	Arm	CNV6924
	54	Guide	CNV6921
	55	Rack	CNV6923
	56	Clamper	CNV6331
	57	Arm	CNV6332
	58	Guide	CNV6333
	59	Cover	CNV6334
	60	Arm	CNV6335
	61	Guide	CNV6336
	62	Roller	CNV6338
	63	Damper	CNV6175
	64	Damper	CNV6662
	65	Guide	CNV6925
	66	Chassis Unit	CXB7980
*	67	Arm Unit	CXB7983
	68	Arm Unit	CXB7984
	69	Arm Unit	CXB7985
	70	Motor Unit(M2)	CXB5903
	71	Screw Unit	CXB5904
	72	Gear Unit	CXB8076
	73	Bracket Unit	CXB7982
	74	Motor Unit(M1)	CXB6007
	75	Arm Unit	CXB8504
	76	Screw(M2x5)	EBA1028
	77	Screw	JFZ20P020FTC
	78	Screw	JGZ17P020FZK
	79	Washer	YE15FTC
	80	Washer	YE20FTC
	81	Pickup Unit(Service)(P9)	CXX1481
	82	Screw	IMS26P030FTC
	83	Guide	CNV6922
	84	Roller	CNV6887
	85	Spring	CBH2509
	86	Spring	CBH2512
	87	Spring	CBH2536
	88	Collar	CNV6906
	89	Damper	CNV6863

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM

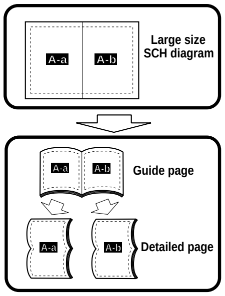



RESET
IC 801
S-80842CNDYI
RESET
VDD
DIAGNOSTICS
IC 604
BR9010FV-W
PDO,PDI,PCK
EPCE,WC
SYSTEM CONTROLLER
IC 601(1/2)
PD5756A
SYSPWR
BSENS
ASENS
ILMI
ILMINT
PWMIN
CLIPIN
LOCL
SD
SL
ST
PLLCE
PCK
PLLCE2
PDO
PDI
PDIO
VDD REGULATOR
Q808
Q873
Q874
B.UP
SWVDD
SYS+B REGULATOR
Q805
Q804
Q807
Q806
SYS+B
SYSPW
Q691
SYSPWR
Q852
Q840
Q841
B SENSE
A SENSE
ACC
Q850
Q851
HARDMUTE
ILMIN
Q872
Q870
Q871
BACKUP
IC202 NJM2904V
IC203 NJM2904V
FLP
RLP
Q231
CN601
ILL+
START
Q321
Q323
Q325
Q327
ELECTRONIC VOLUME/
SOURCE SELECTOR
TUNER L
CD L
LIN1-L
LIN3-L
IC 101
PML010A
FL
RL
IC301
NJM2068V
IC302
NJM2068V
FIX EQUALIZER
POWER AMP
IC 201
TDA7384
FLIN
RLIN
MUTE
STBY
FL+
FL-
RL+
RL-
Q329
ECLK,EDT,EVCE
Q201
Q202
FMUTE
HARDMUTE
IC 603
TC7S86F
ROTINT
ROTIN0
ROTIN1
WAKEUP
CN604
CN901
Q821
Q692
Q822
Q823
ILL+B
Q809
Q810
SWVDD
KDT0-KDT4,KST0-KST5
LCDCE,LCDINH,LCDCLK,LCDDT
Q824
Q827
Q825
Q826
BL+B
B KEYBOARD UNIT
VOLUME/POWER
VR901
Q906
Q901
Q902
Q904
CLK
CD EJECT
KD3
KD2
KD0
KST5
ILLUMINATION
SWDVDD
KEY MATRIX
LCD DRIVER
IC 901
LC75813E
LCD 904
LCD BACKLIGHT

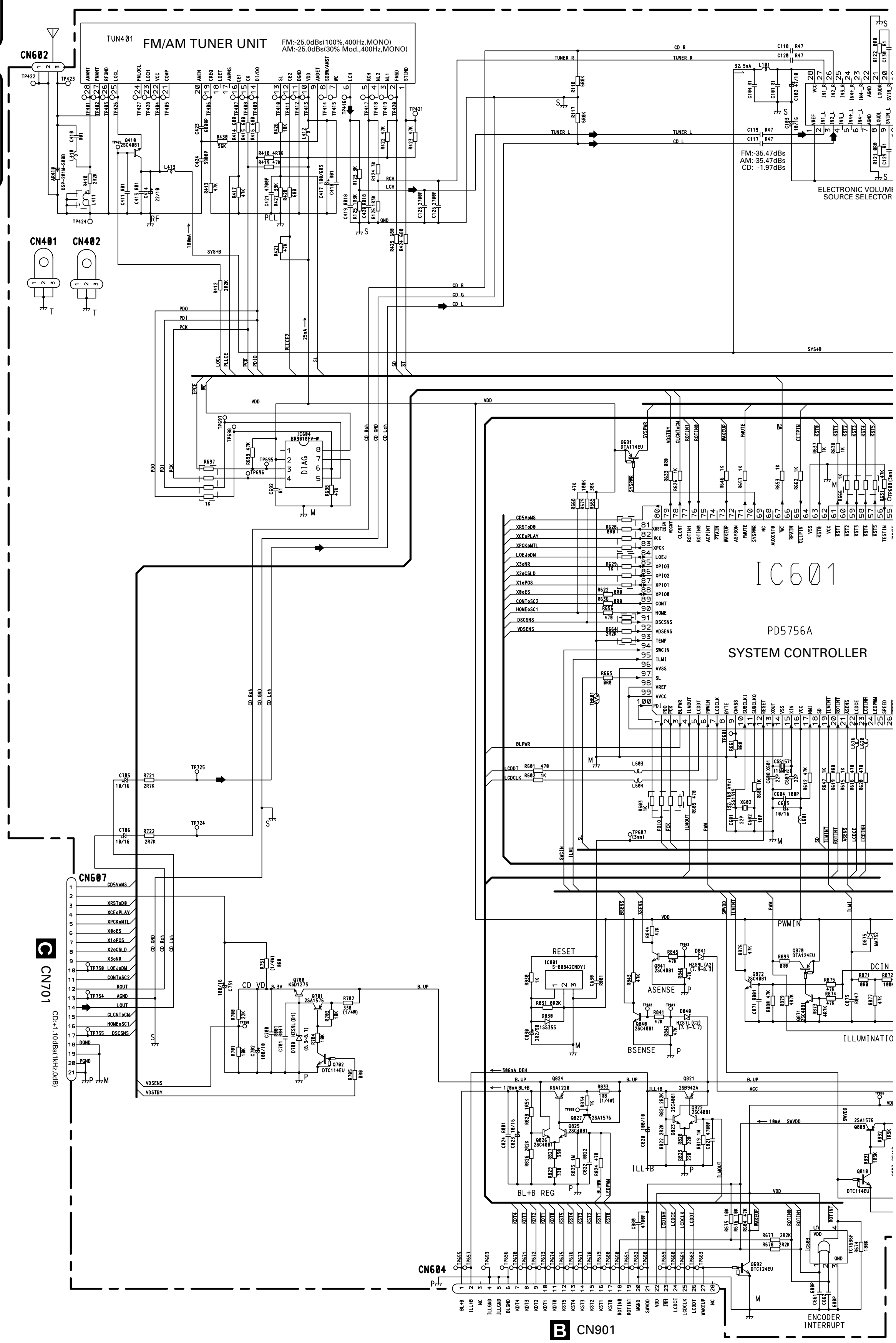
A
B
C
D
E
F

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to " EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

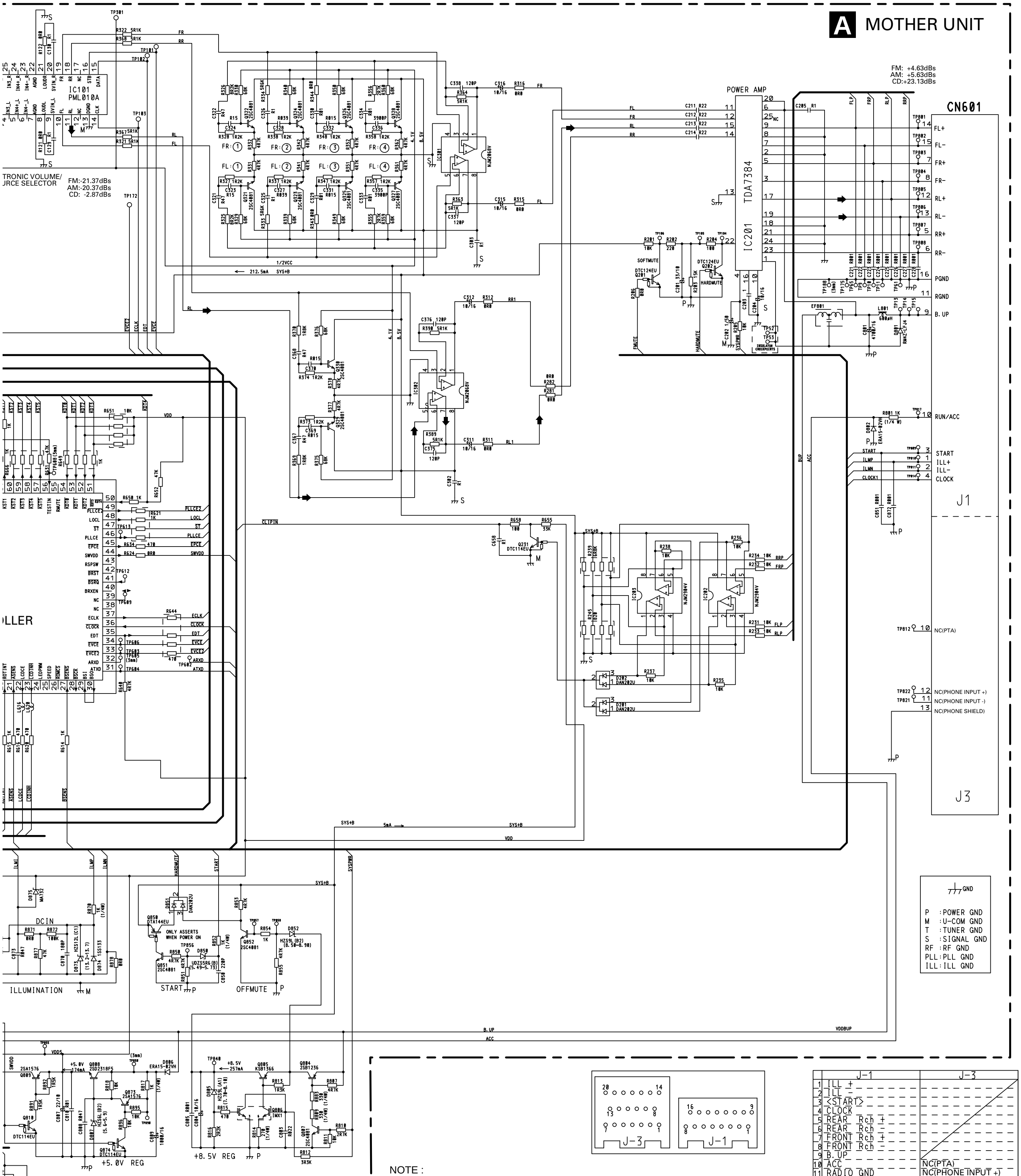


A-a



A

A-b



NOTE :
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

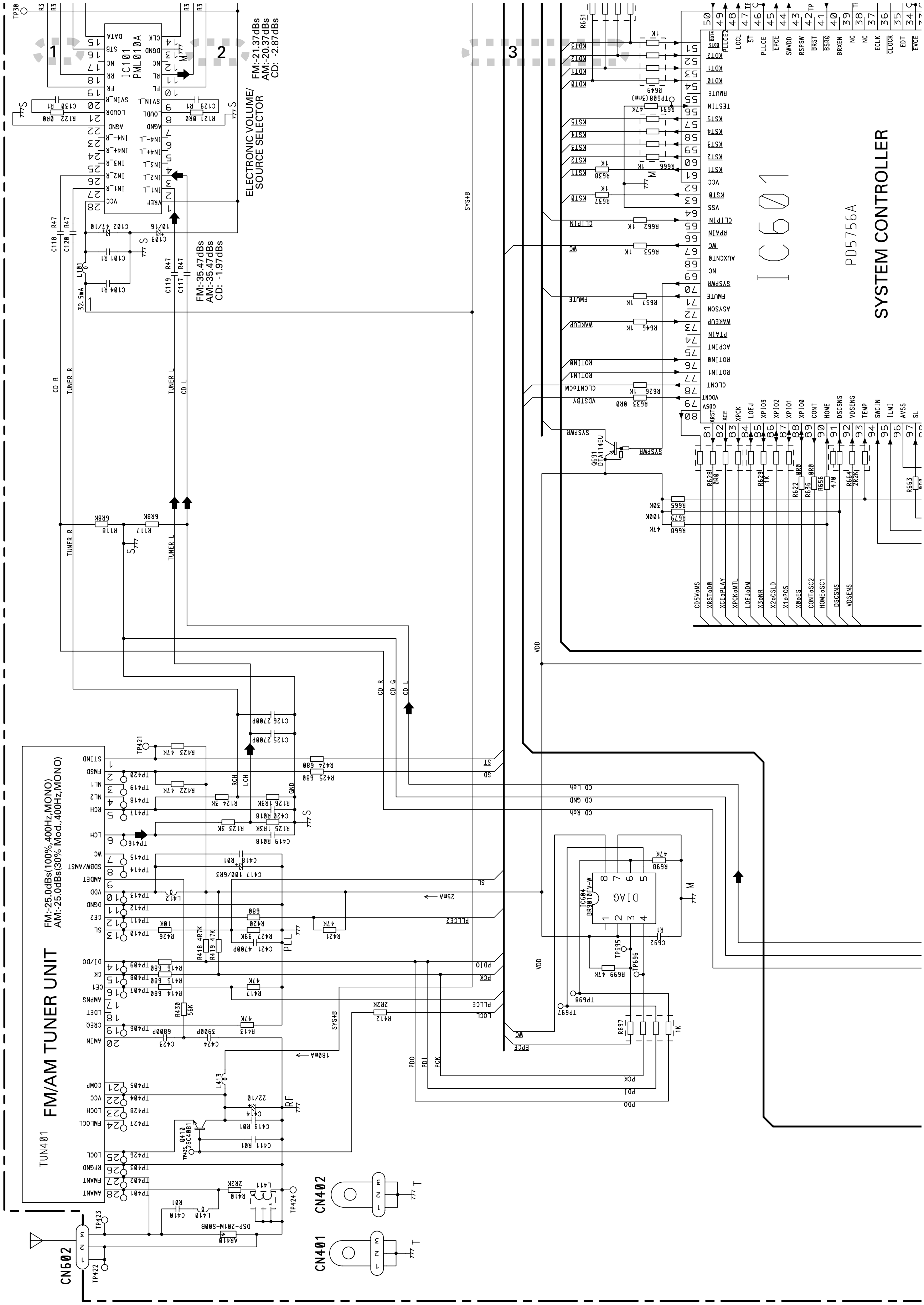
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022

	J-1	J-3
1	ILL +	
2	ILL −	
3	<START>	
4	CLOCK	
5	REAR Rch +	
6	REAR Rch −	
7	FRONT Rch +	
8	FRONT Rch −	
9	B.UP	
10	ACC	NC(PTA)
11	RADIO GND	NC(PHONE INPUT +)
12	REAR Lch +	NC(PHONE INPUT -)
13	REAR Lch −	NC(PHONE SHIELD)
14	FRONT Lch +	
15	FRONT Lch −	
16	POWER AMP GND	
17		
18		
19		
20		

1 2 3 4

A-b

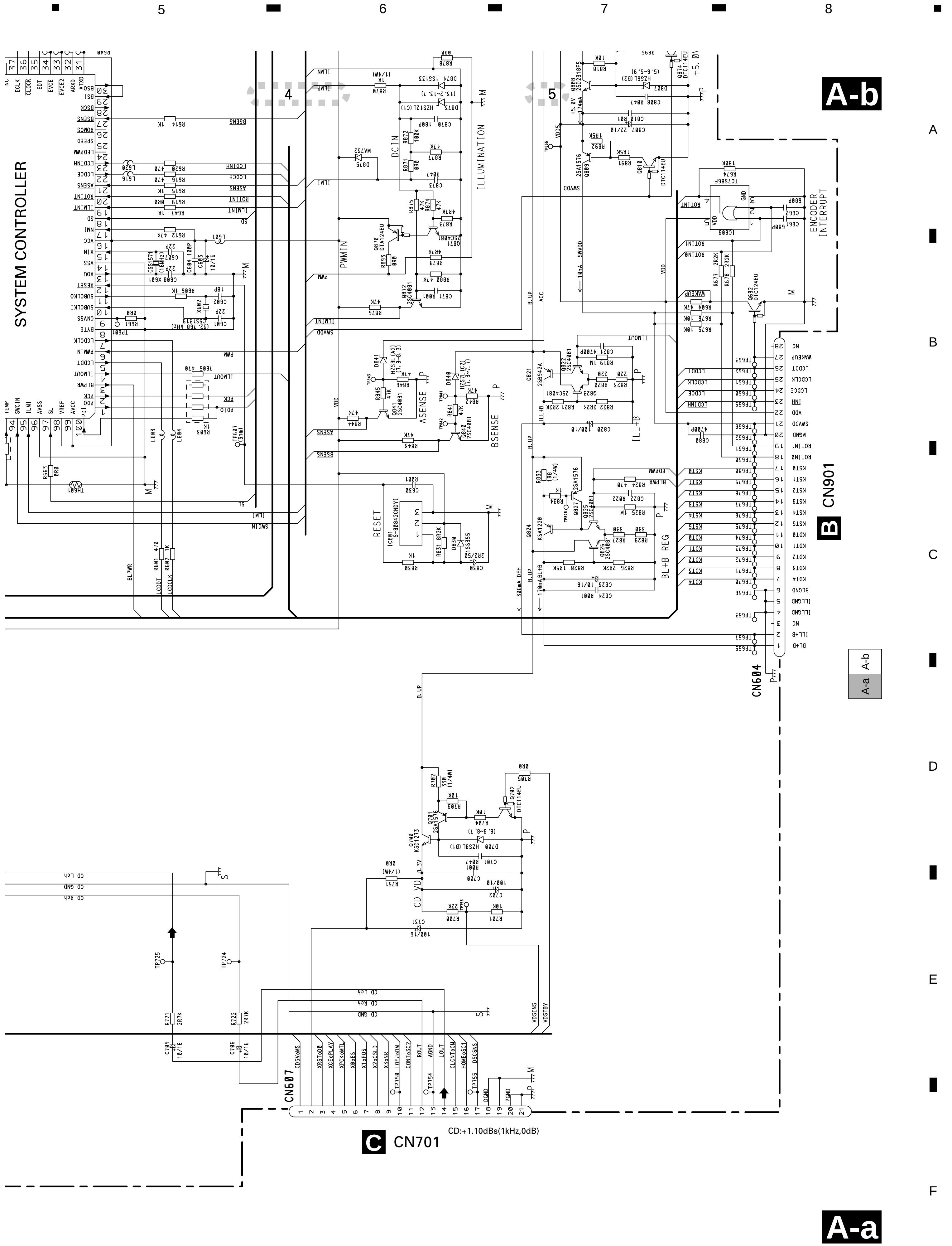
A
B
C
D
E
F

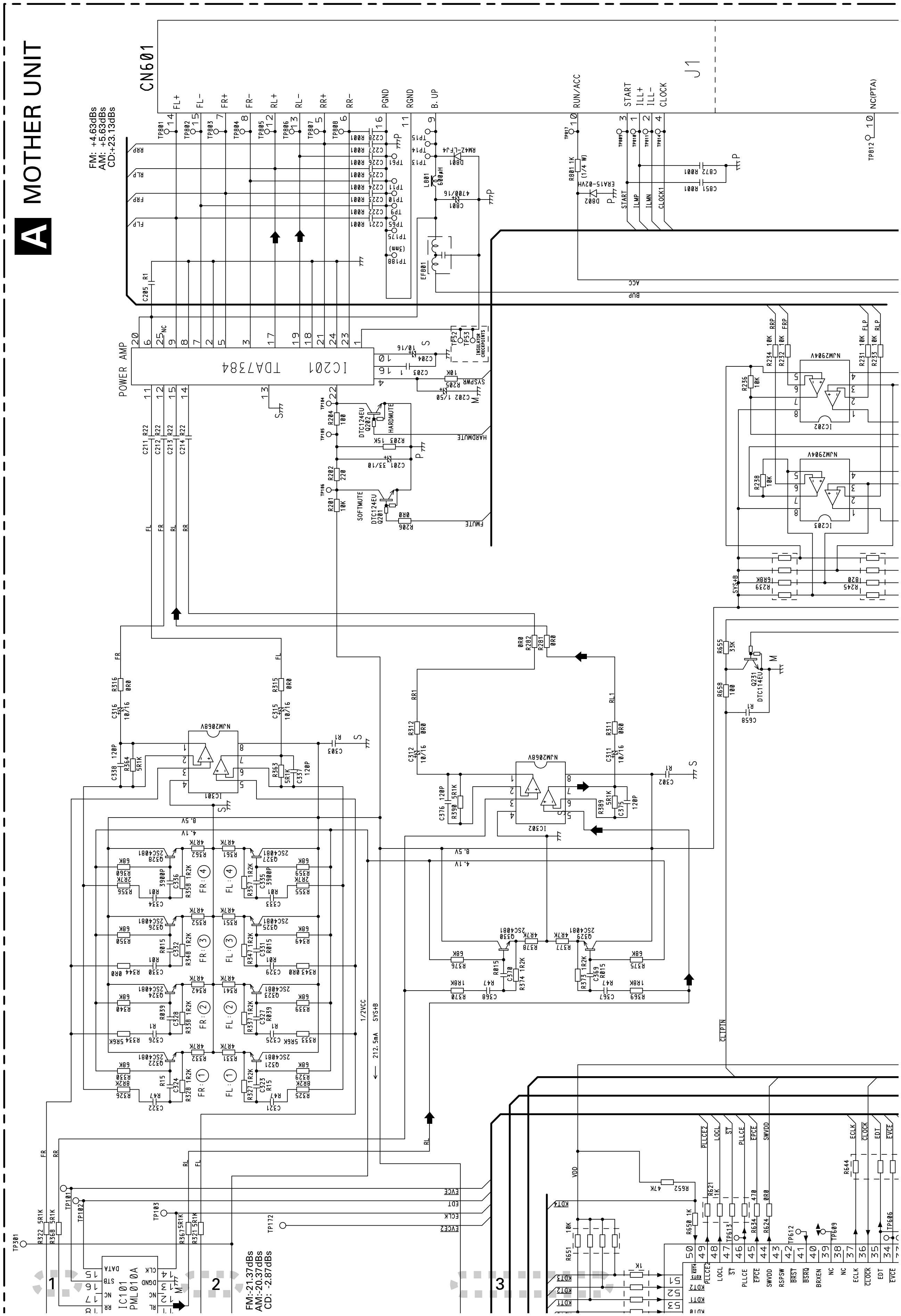


A-b
A-a

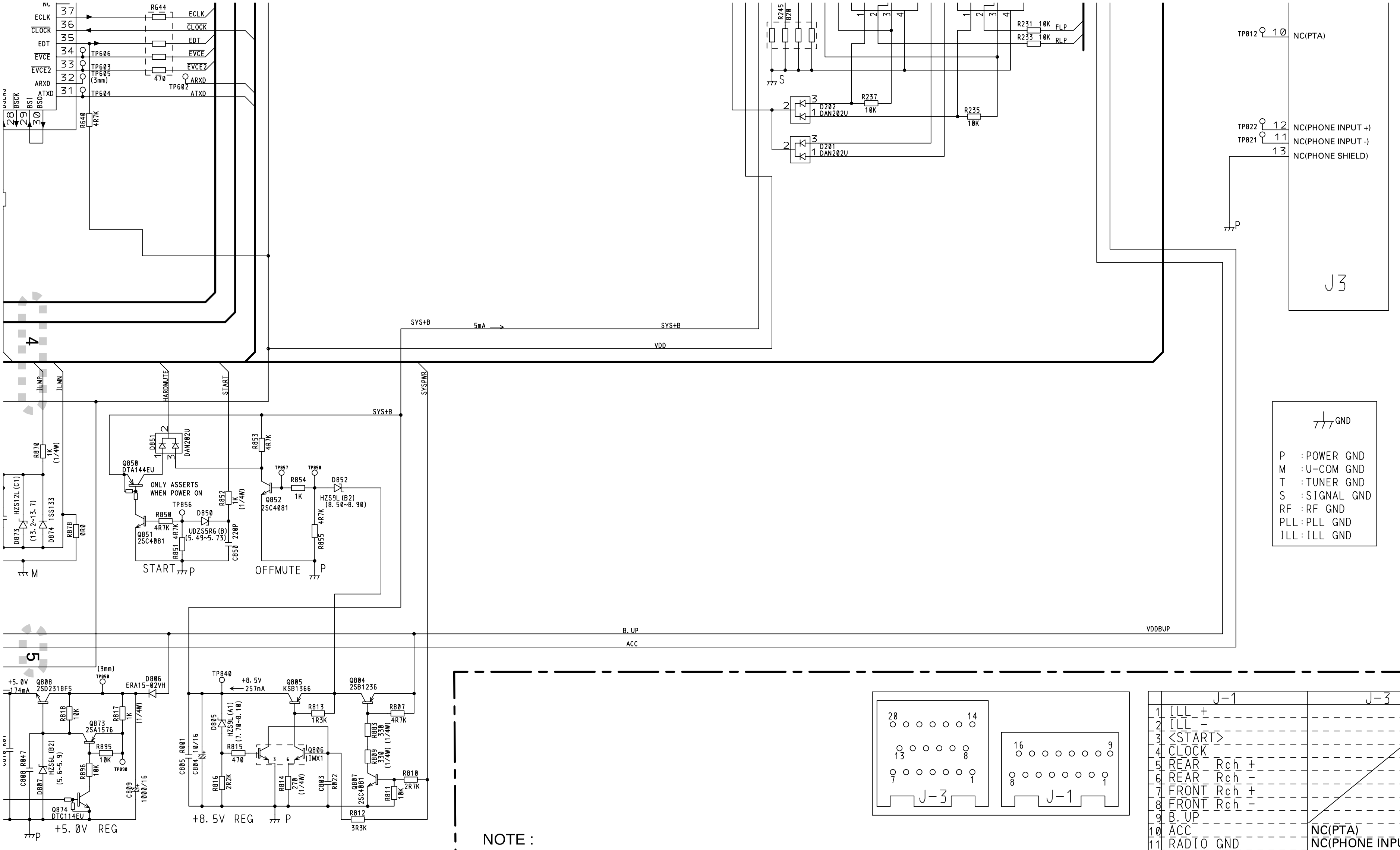
A-a

1 2 3 4


A-b
A-a
SYSTEM CONTROLLER
ILLUMINATION
DCIN
PWMIN
ENCODER INTERRUPT
ASENSE
BSENSE
RESET
ILL+B
BL+B REG
B CN901
CN604
CN607
C CN701
CD:+1.10dBs(1kHz,0dB)


A MOTHER UNIT
CN601
J1
POWER AMP
IC201 TDA7384
IC101 PML010A
FM: +4.63dBs
AM: +5.63dBs
CD:+23.13dBs
FM:-21.37dBs
AM:-20.37dBs
CD: -2.87dBs

A-b



	J-1	J-3
1	ILL +	
2	ILL -	
3	<START>	
4	CLOCK	
5	REAR Rch +	
6	REAR Rch -	
7	FRONT Rch +	
8	FRONT Rch -	
9	B.UP	
10	ACC	NC(PTA)
11	RADIO GND	NC(PHONE INPUT +)
12	REAR Lch +	NC(PHONE INPUT -)
13	REAR Lch -	NC(PHONE SHIELD)
14	FRONT Lch +	
15	FRONT Lch -	
16	POWER AMP GND	
17		
18		
19		
20		

NOTE :

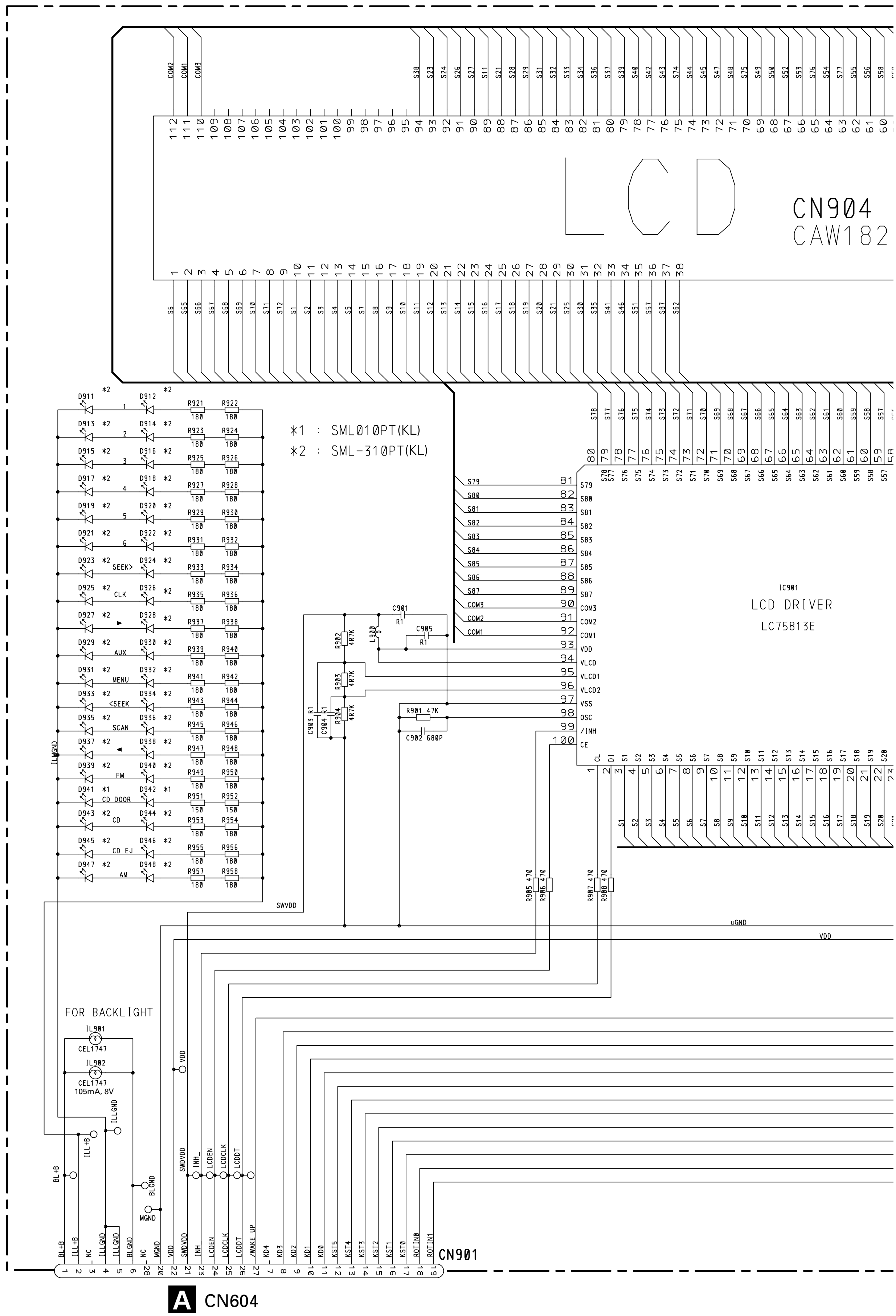
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

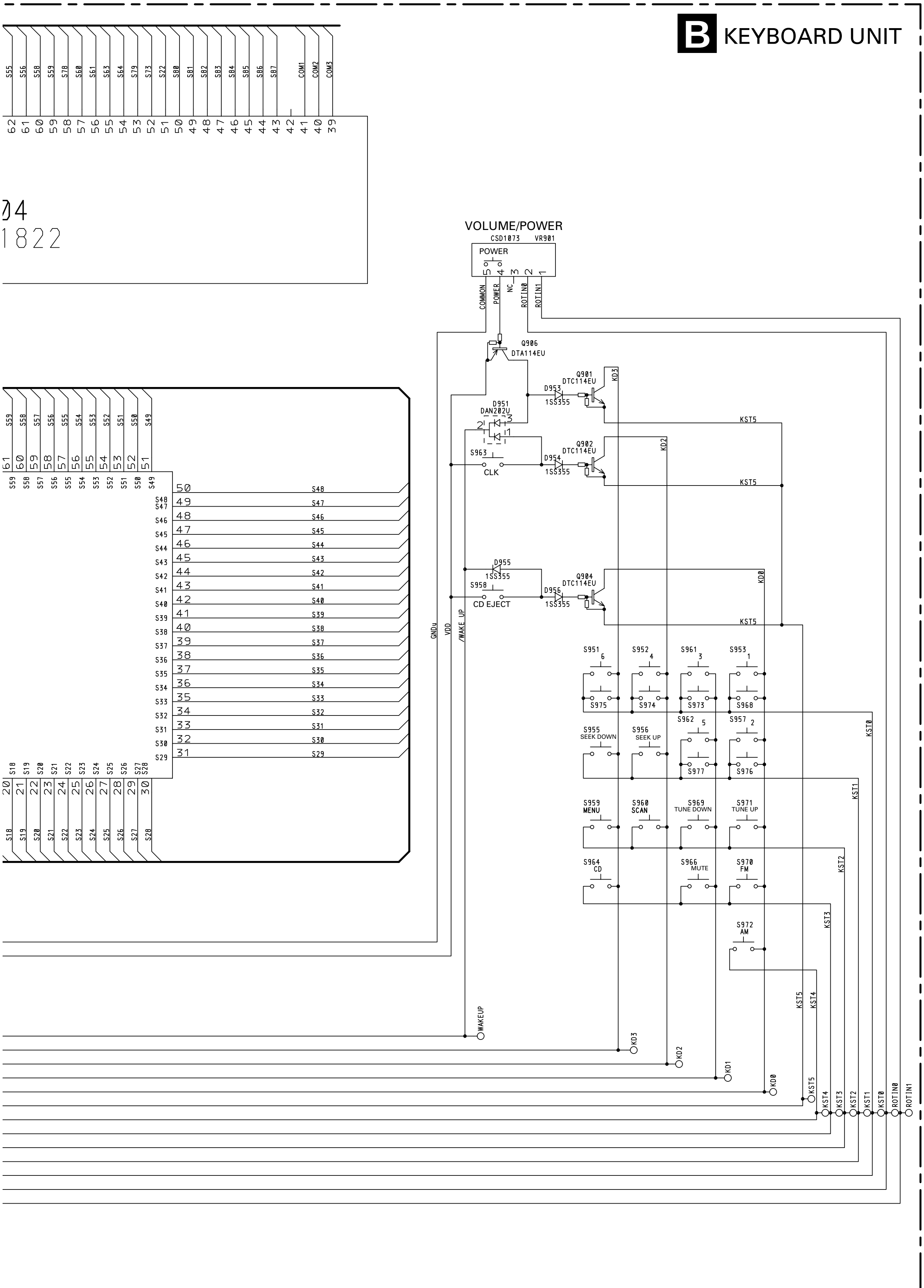
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022

A-a A-b

3.3 KEYBOARD UNIT

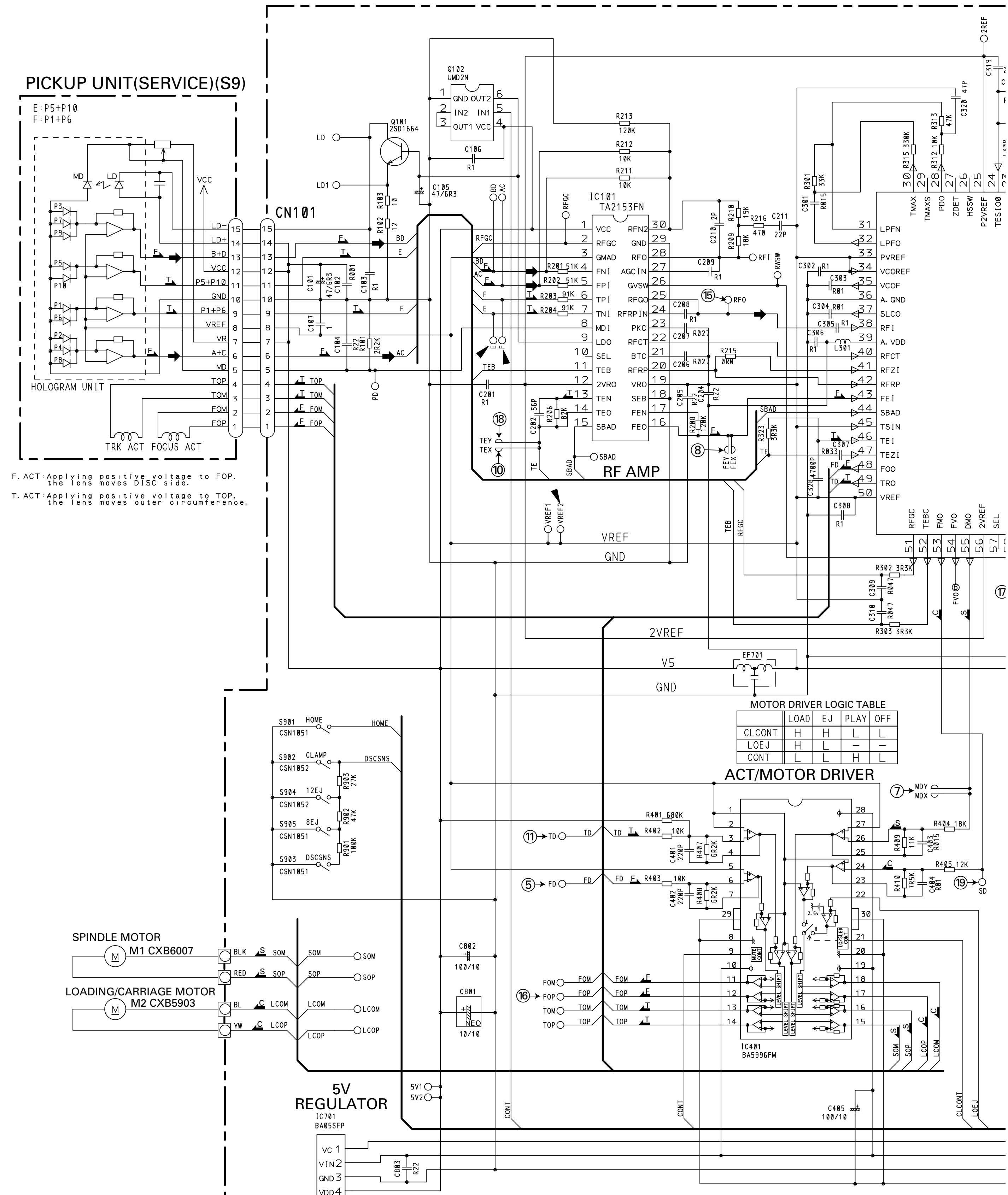
A
B
C
D
E
F





B KEYBOARD UNIT
VOLUME/POWER
CSD1073 VR901
POWER
COMMON
POWER
NC
ROTIN0
ROTIN1
Q906
DTA114EU
Q901
DTC114EU
D953
1SS355
D951
DAN202U
S963
CLK
D954
1SS355
Q902
DTC114EU
D955
1SS355
S958
CD EJECT
D956
1SS355
Q904
DTC114EU
KD3
KD2
KD0
KST5
GNDu
VDD
/WAKE UP
S951 6
S952 4
S961 3
S953 1
S975
S974
S973
S968
S955 SEEK DOWN
S956 SEEK UP
S962 5
S957 2
S977
S976
S959 MENU
S960 SCAN
S969 TUNE DOWN
S971 TUNE UP
S964 CD
S966 MUTE
S970 FM
S972 AM
KST0
KST1
KST2
KST3
KST4
WAKEUP
KD1
ROTIN0
ROTIN1
COM1
COM2
COM3
04
1822

3.4 CD MECHANISM MODULE

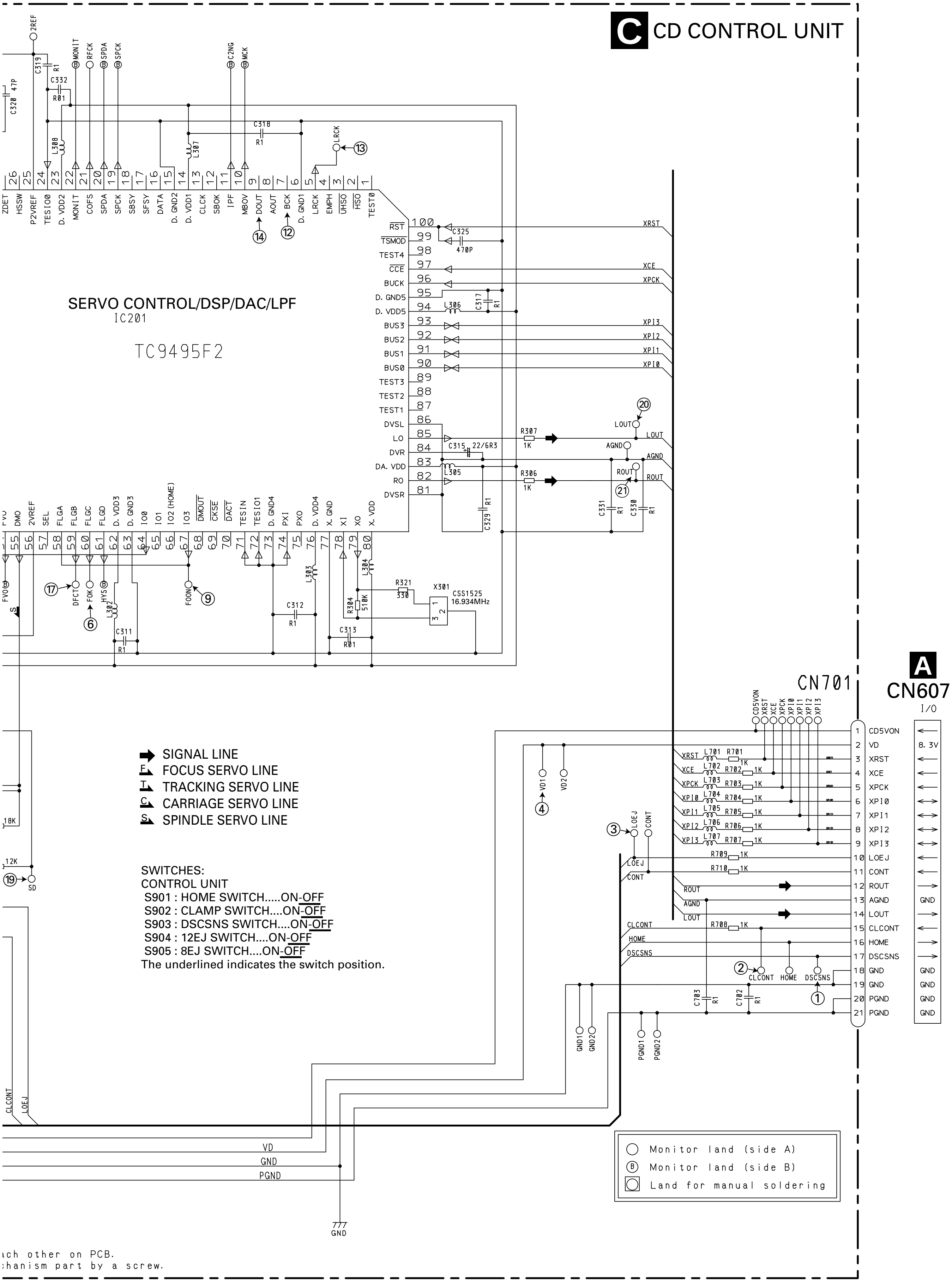


MOTOR DRIVER LOGIC TABLE

	LOAD	EJ	PLAY	OFF
CLCONT	H	H	L	L
LOEJ	H	L	–	–
CONT	L	L	H	L

NOTE1) GND ...CD LSI
PGND ...Actuator, Motor Driver
AGND ...Audio

These GND's are not connected to each othe
PGND is connected to a floating mechanism

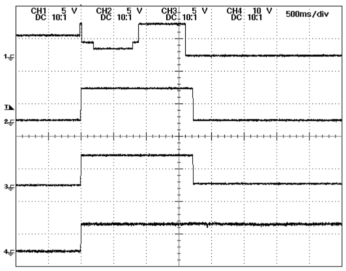

C CD CONTROL UNIT
SERVO CONTROL/DSP/DAC/LPF
IC201
TC9495F2
X301
CSS1525
16.934MHz
CN701
A
CN607
I/O
SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
SWITCHES:
CONTROL UNIT
S901 : HOME SWITCH.....ON-OFF
S902 : CLAMP SWITCH....ON-OFF
S903 : DSCSNS SWITCH....ON-OFF
S904 : 12EJ SWITCH....ON-OFF
S905 : 8EJ SWITCH....ON-OFF
The underlined indicates the switch position.
Monitor land (side A)
Monitor land (side B)
Land for manual soldering
VD
GND
PGND

Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
VREF:2.1V

● Waveforms

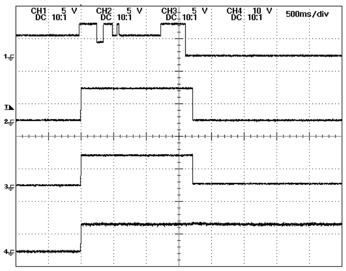
① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div.
③ CH3:LOEJ 5V/div.
④ CH4:VD1 10V/div.
500ms/div.
When loading (12 cm CD)

Ref. : GND
Mode : Normal



① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div.
③ CH3:LOEJ 5V/div.
④ CH4:VD1 10V/div.
500ms/div.
When loading (8 cm CD)

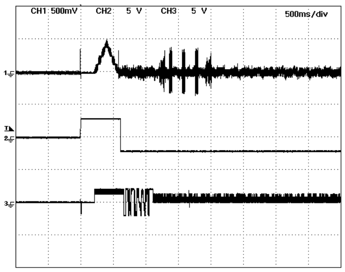
Ref. : GND
Mode : Normal



⑤ CH1:FD 500mV/div.
⑥ CH2:FOK 5V/div.
⑦ CH3:MD 5V/div.
500ms/div.

When setting up "Source On"

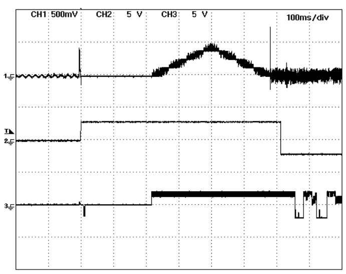
Ref. : VREF
Mode : Normal



⑤ CH1:FD 500mV/div.
⑥ CH2:FOK 5V/div.
⑦ CH3:MD 5V/div.
100ms/div.

Magnified drawing for "time"

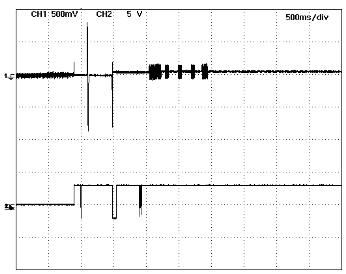
Ref. : VREF
Mode : Normal



⑧ CH1:FE 500mV/div.
⑨ CH2:FOON 5V/div.
500ms/div.

When setting up "Source On"

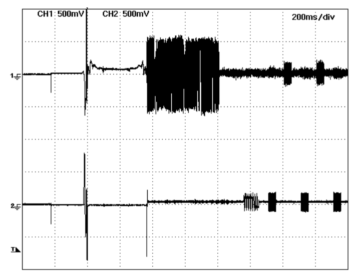
Ref. : VREF
Mode : Normal



⑩ CH1:TE 500mV/div.
⑧ CH2:FE 500mV/div.
200ms/div.

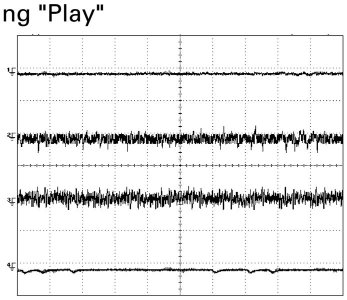
When setting up "Source On"

Ref. : VREF
Mode : Normal



⑧ CH1:FE 500mV/div.
⑤ CH2:FD 500mV/div.
⑩ CH3:TE 500mV/div.
⑪ CH4:TD 500mV/div.
1ms/div.
During "Play"

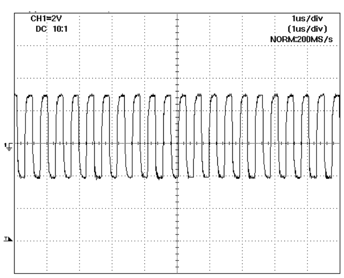
Ref. : VREF
Mode : Normal



⑫ CH1:BCK 2V/div. 1μs/div.

During "Play"

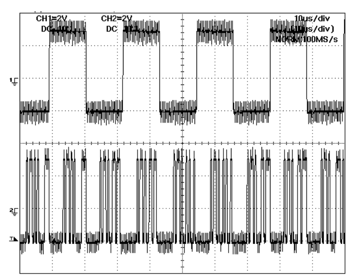
Ref. : VREF
Mode : Normal



⑬ CH1:LRCK 2V/div.
⑭ CH2:DOUT 2V/div.
10μs/div.

During "Play"

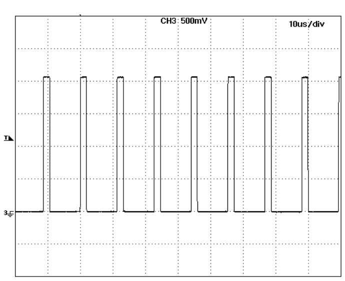
Ref. : VREF
Mode : Normal



⑦ CH1:MD 500mV/div. 10μs/div.

During "Play"

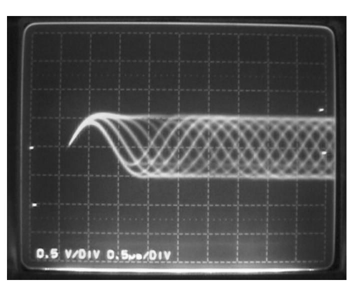
Ref. : VREF
Mode : Normal



⑮ CH1:RFO 500mV/div. 0.5μs/div.

During "Play"

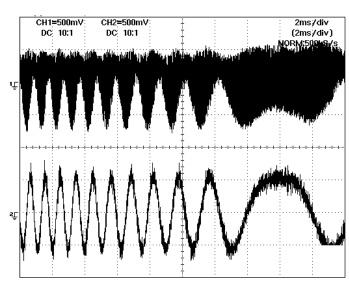
Ref. : VREF
Mode : Normal



⑮ CH1:RFO 500mV/div.
⑩ CH2:TE 500mV/div.
2ms/div.

During "Tracking Open"

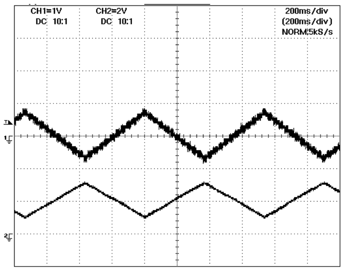
Ref. : VREF
Mode : Test



⑤ CH1:FD 1V/div.
⑯ CH2:FOP 2V/div.
200ms/div.

With no disk inserted
During "Focus Close"

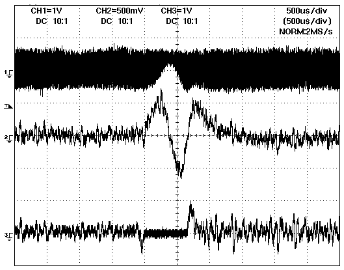
Ref. : VREF
Mode : Test



⑮ CH1:RFO 1V/div.
⑩ CH2:TE 500mV/div.
⑪ CH3:TD 1V/div.
500µs/div.

1 Track Jump

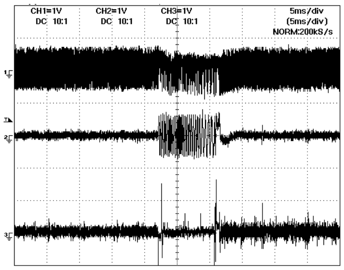
Ref. : VREF
Mode : Test



⑮ CH1:RFO 1V/div.
⑩ CH2:TE 1V/div.
⑪ CH3:TD 1V/div.
5ms/div.

32 Track Jump

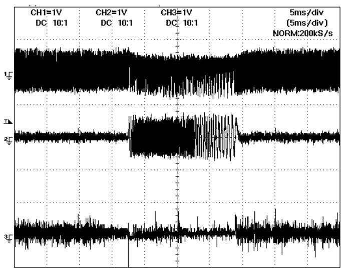
Ref. : VREF
Mode : Test



⑮ CH1:RFO 1V/div.
⑩ CH2:TE 1V/div.
⑪ CH3:TD 1V/div.
5ms/div.

100 Track Jump

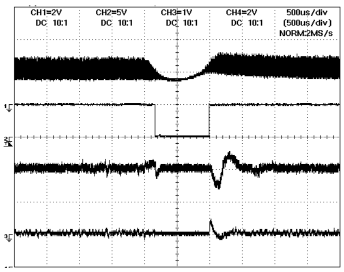
Ref. : VREF
Mode : Test



⑮ CH1:RFO 2V/div.
⑰ CH2:DFCT 5V/div.
⑤ CH3:FD 1V/div.
⑪ CH4:TD 2V/div.
500µs/div.

When reproducing black dots (800µm)

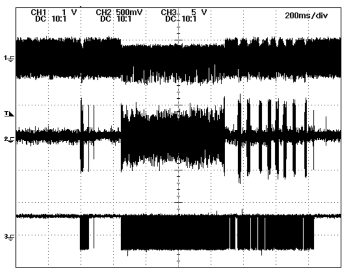
Ref. : VREF
Mode : Normal



⑮ CH1:RFO 1V/div.
⑩ CH2:TE 500mV/div.
⑰ CH3:DFCT 5V/div.
200ms/div.

During inside/outside search

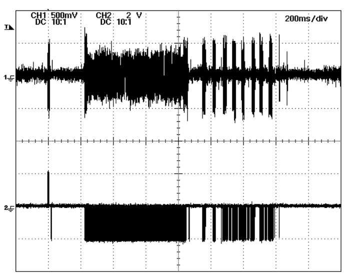
Ref. : VREF
Mode : Normal



⑱ CH1:TEY 500mV/div.
⑲ CH2:SD 2V/div.
200ms/div.

During inside/outside search

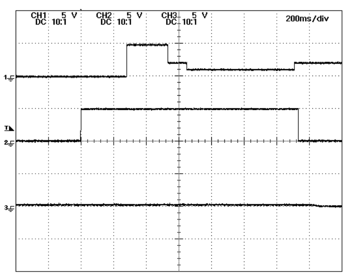
Ref. : VREF
Mode : Normal



① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div.
③ CH3:LOEJ 5V/div.
200ms/div.

When "Eject" (12 cm CD)

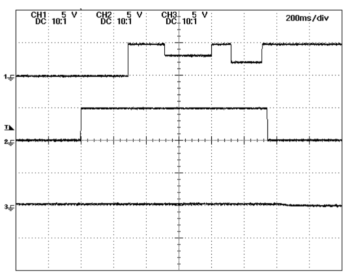
Ref. : GND
Mode : Normal



① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div.
③ CH3:LOEJ 5V/div.
200ms/div.

When "Eject" (8cm CD)

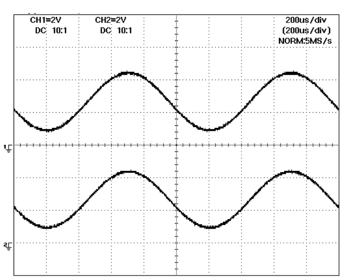
Ref. : GND
Mode : Normal



⑳ CH1:LOUT 2V/div.
㉑ CH2:ROUT 2V/div.
200µs/div.

"Play" in 1kHz, 0dB

Ref. : GND
Mode : Normal

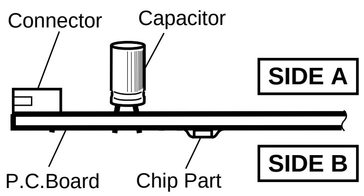


4. PCB CONNECTION DIAGRAM

4.1 MOTHER UNIT

NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



A MOTHER UNIT

IC, Q

Q410

IC301 Q323 Q325 Q327
Q321 Q324 Q328 IC101
Q690 Q322 Q326

IC201
Q851
Q202 Q331
Q850
IC203 Q250 Q329
Q330 Q332
IC250
Q852 Q251 IC302 IC161
IC102
IC202 Q201

Q804 IC801 IC602
IC604
Q870

Q805
Q806
Q871
Q872 Q722 Q721

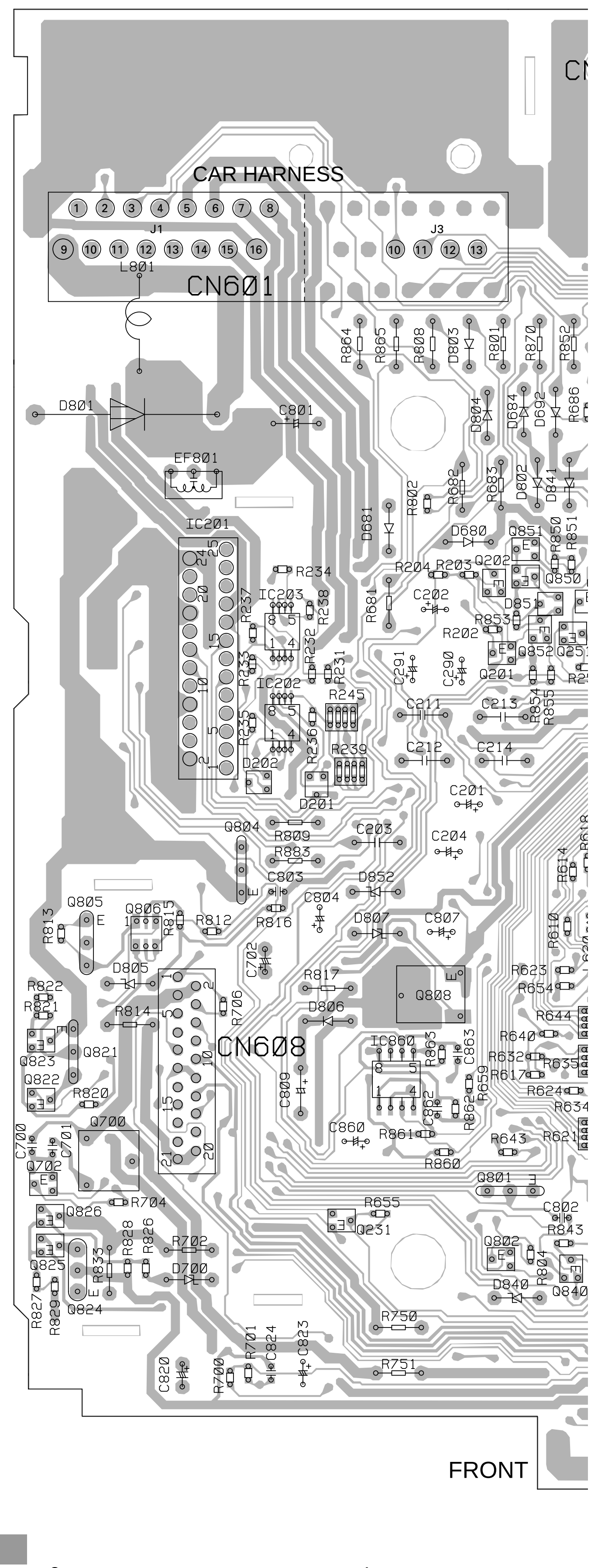
Q808

Q823 Q821 IC860
IC601 Q720
Q822

Q700
Q702 Q801

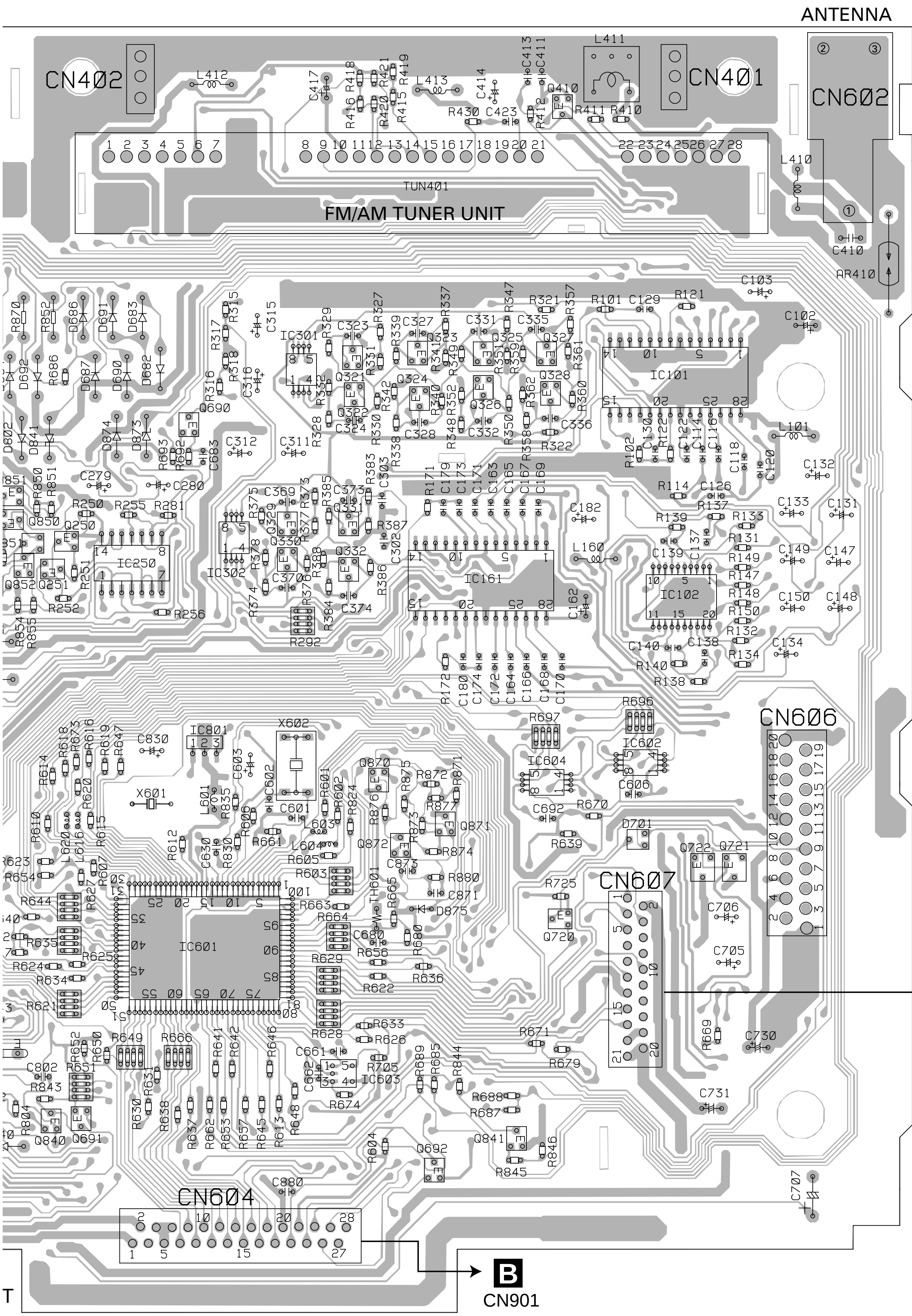
Q826
Q824 Q231 IC603
Q825 Q802

Q691 Q841
Q840 Q692



A

SIDE A



C
CN701

B
CN901

A

A

A MOTHER UNIT

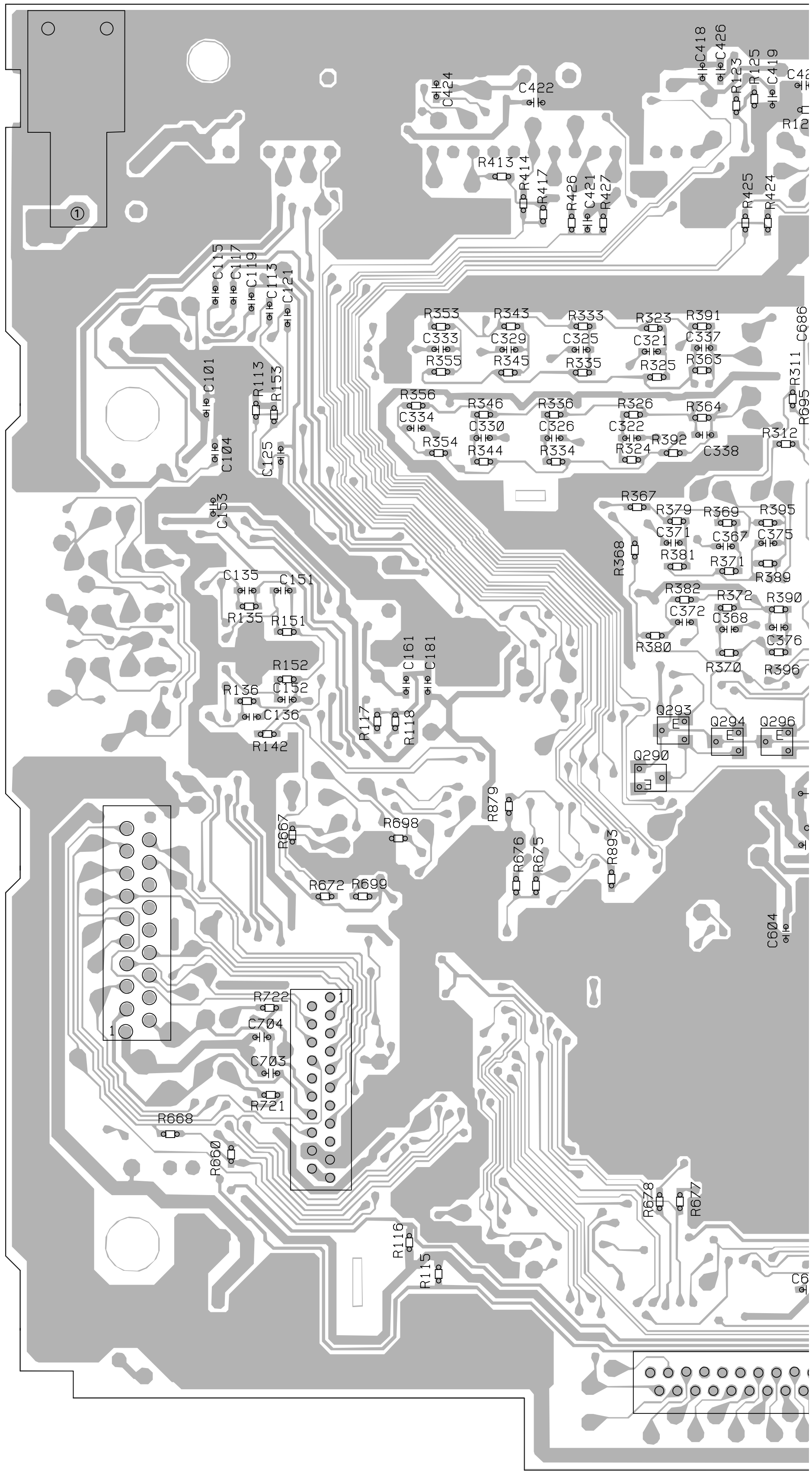
B

C

D

E

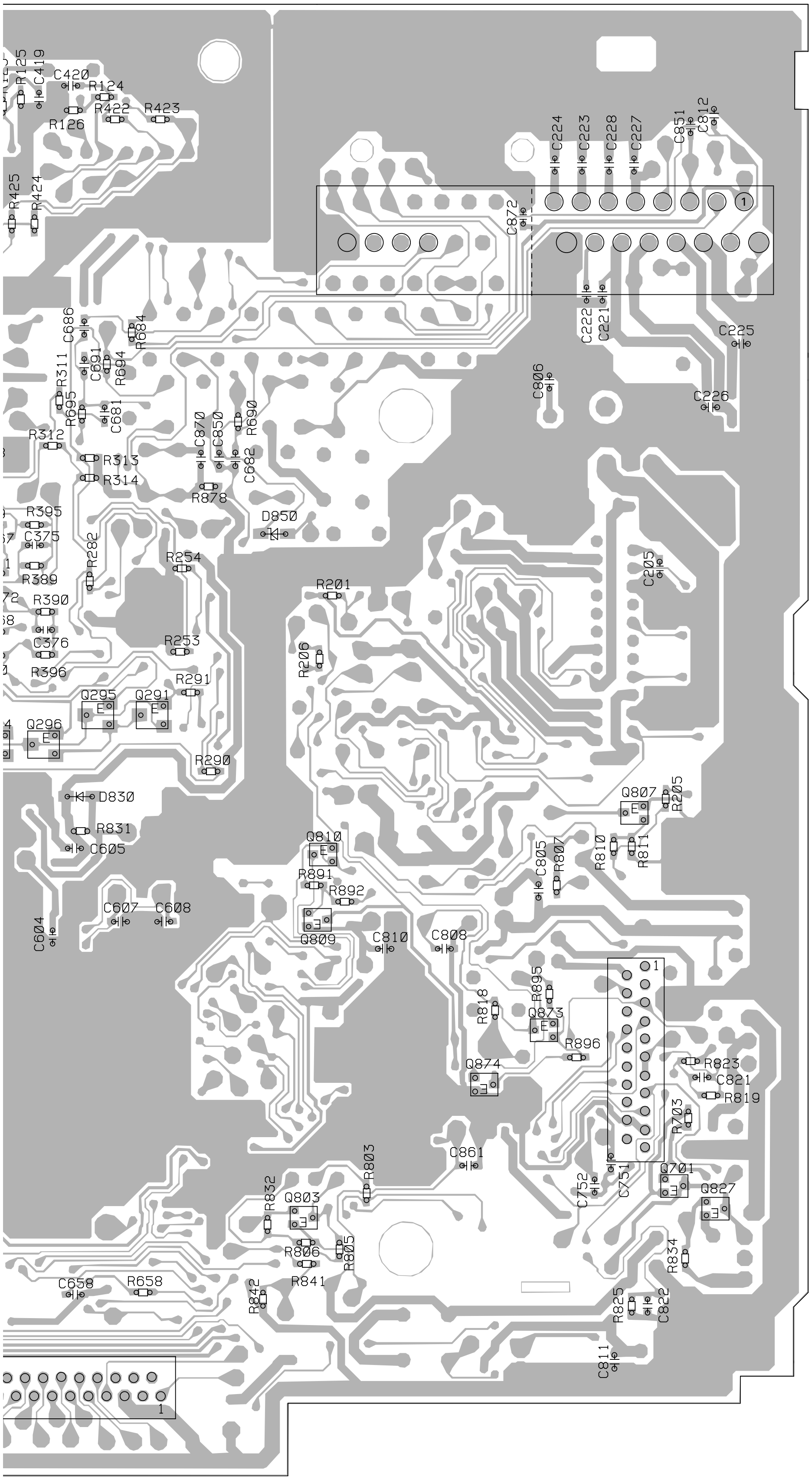
F



A

SIDE B

B



IC,Q

C

Q295 Q291
Q293
Q294 Q296
Q290

D

Q807

Q810

Q809

Q873

E

Q874

Q701

Q803 Q827

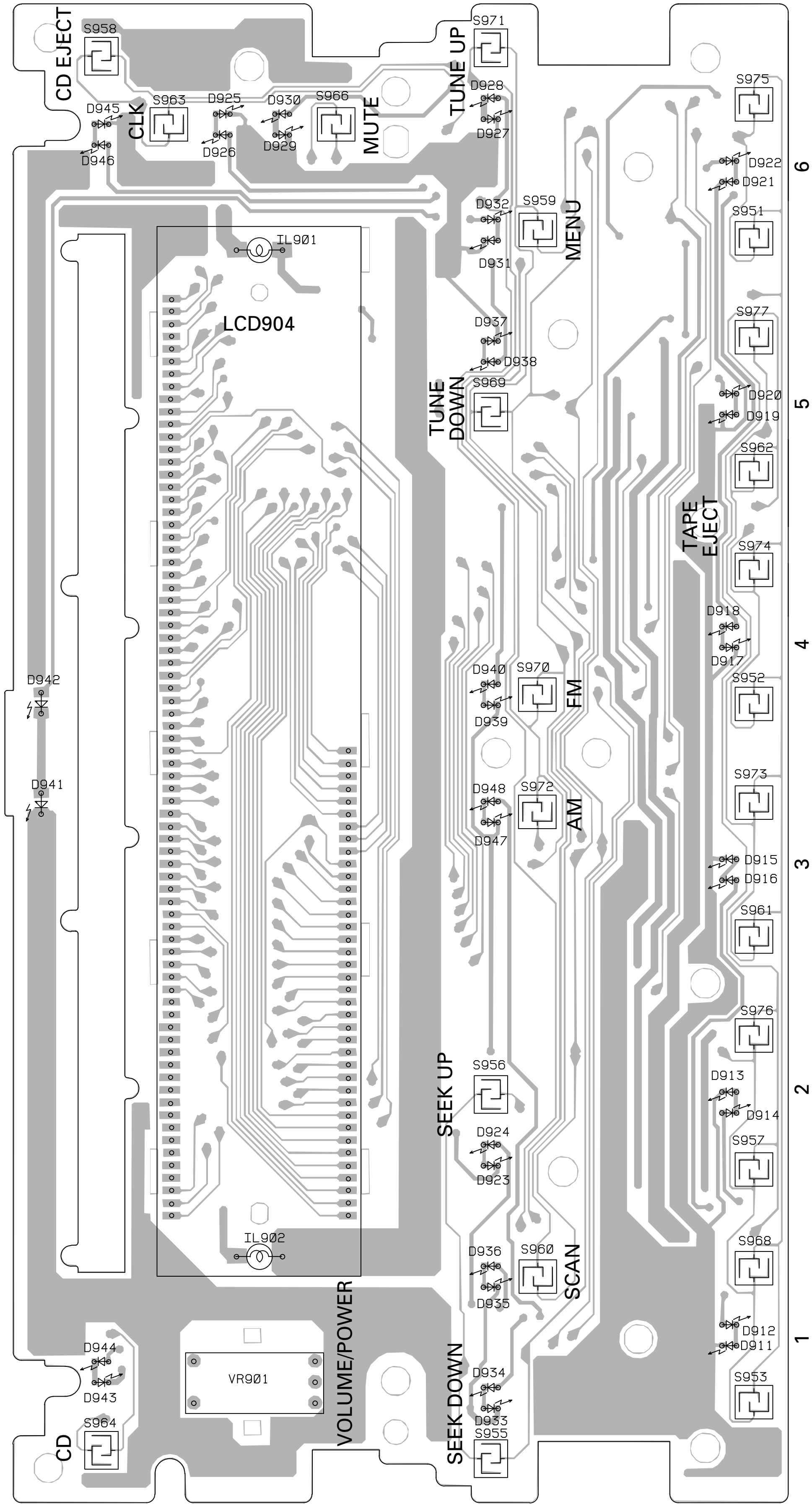
F

A

4.2 KEYBOARD UNIT

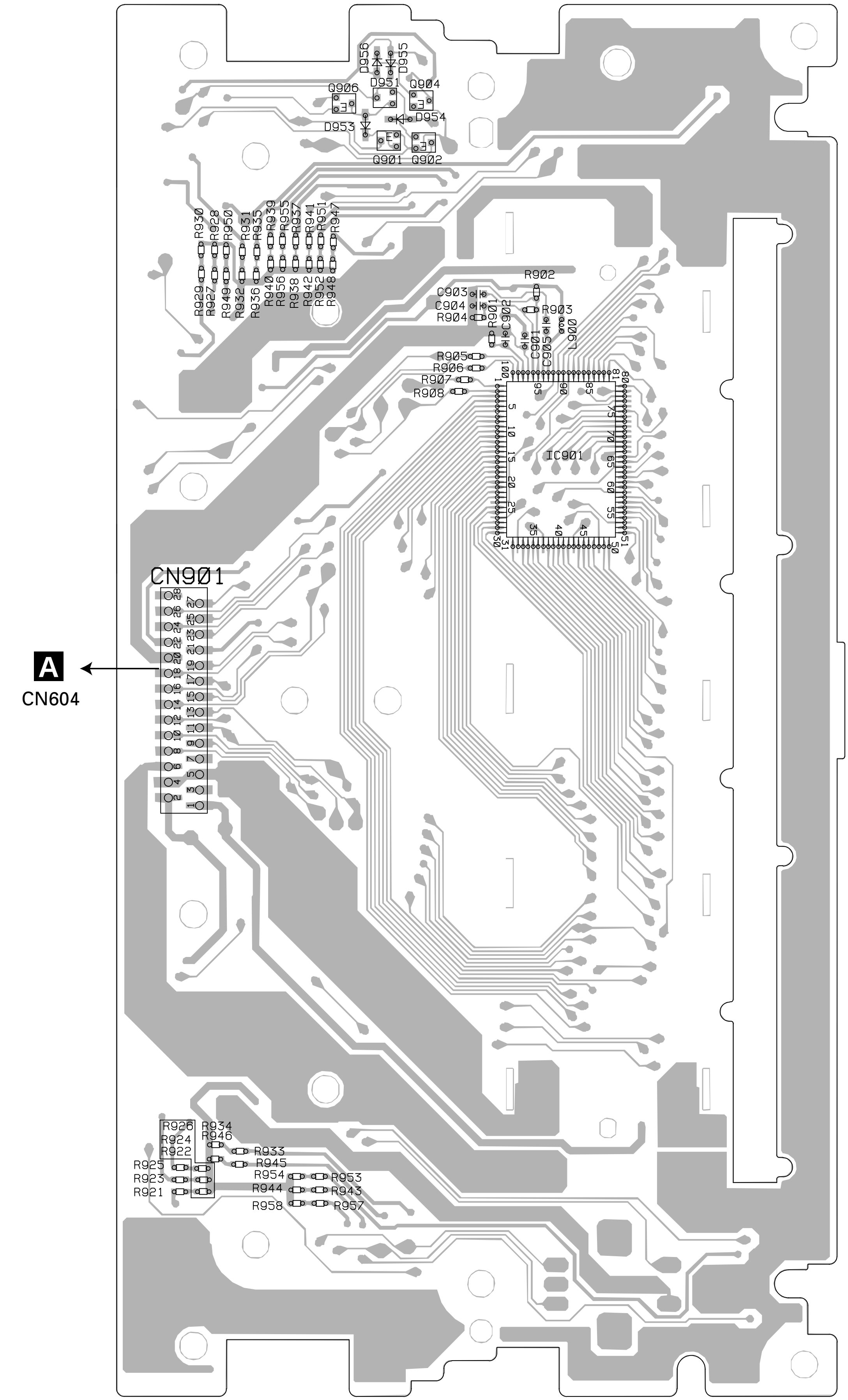
B KEYBOARD UNIT

SIDE A



B KEYBOARD UNIT

SIDE B



IC, Q

Q906 Q904

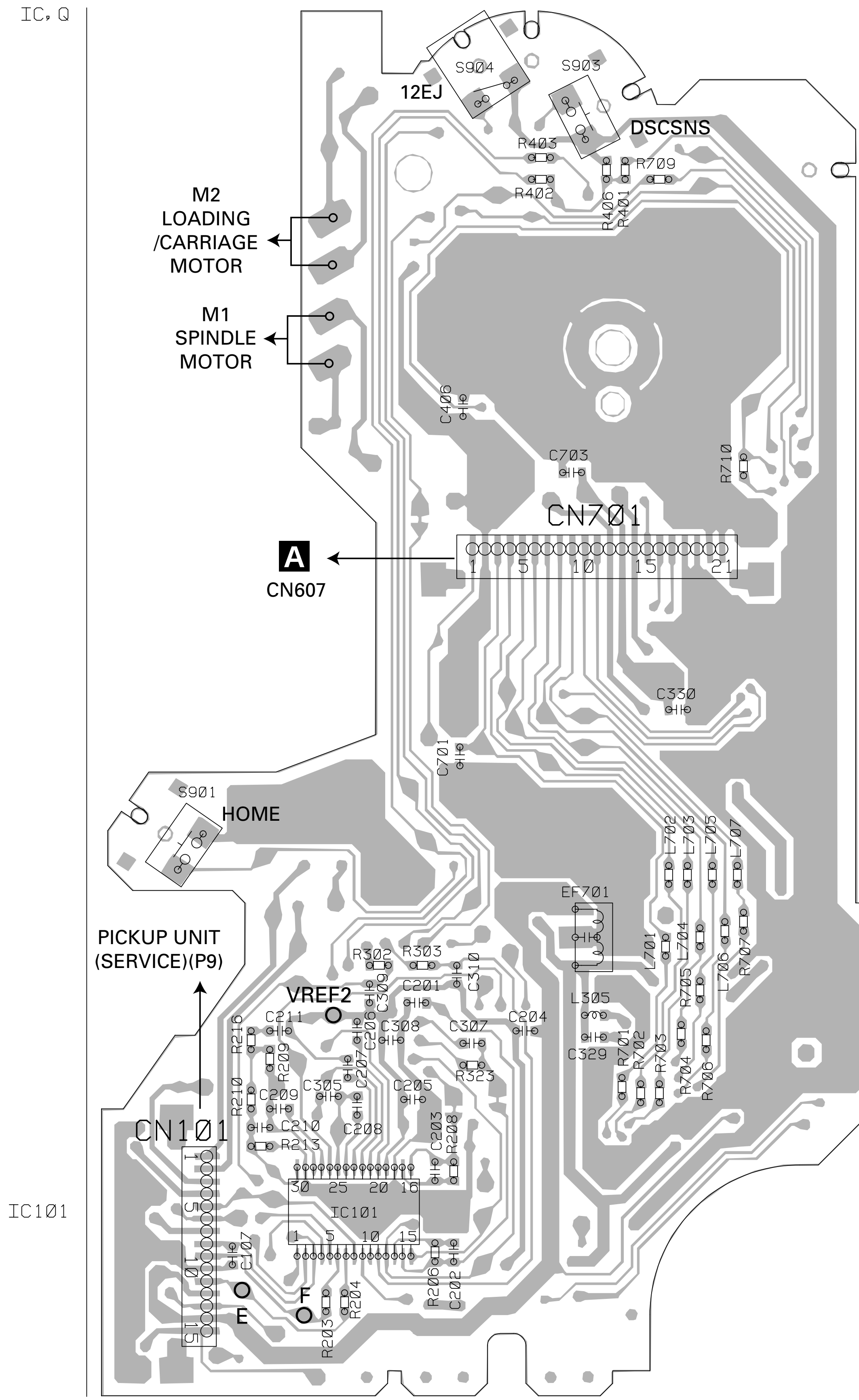
Q901 Q902

IC901

4.3 CD MECHANISM MODULE

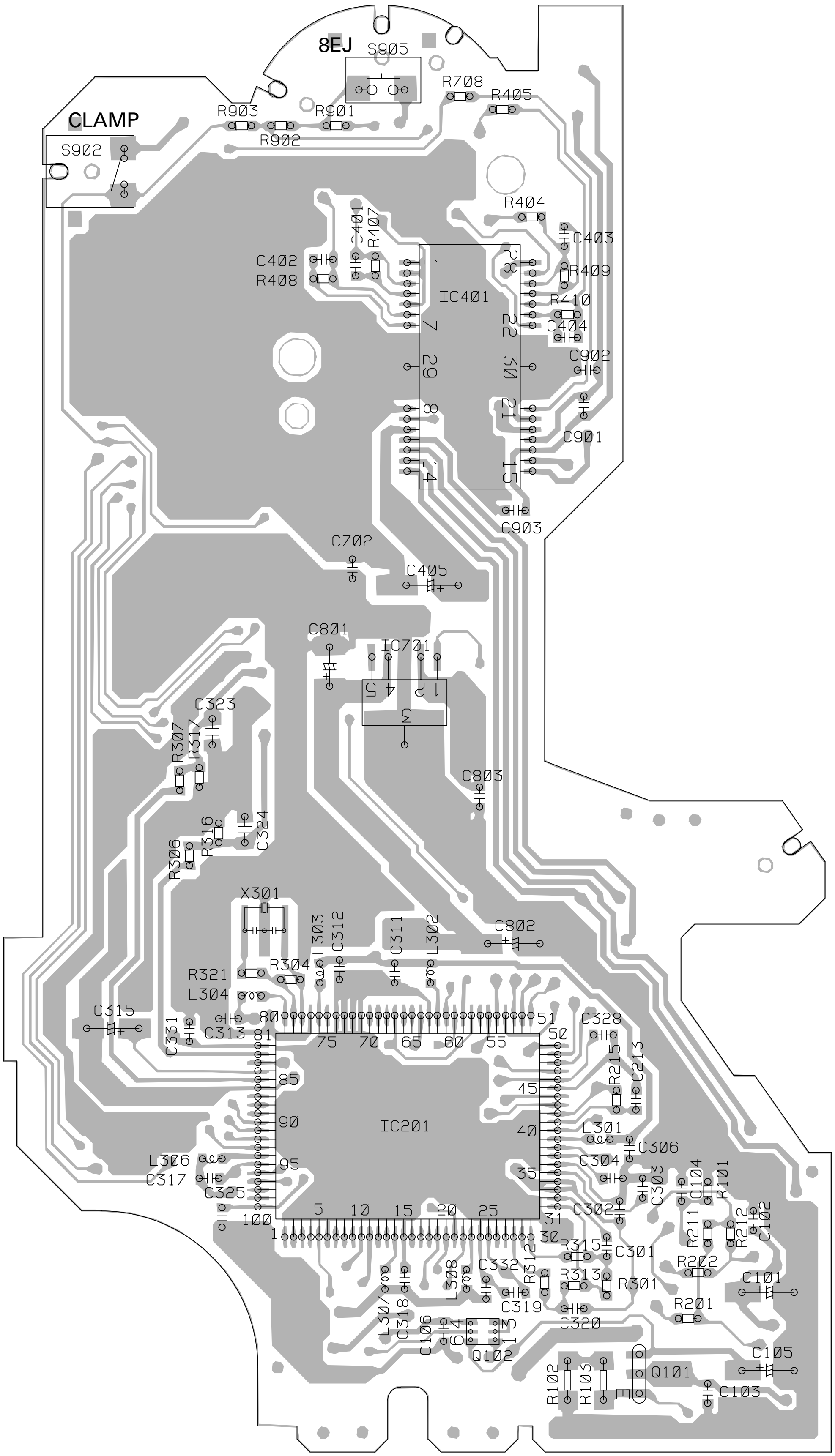
C CD CONTROL UNIT

SIDE A



C CD CONTROL UNIT

SIDE B



IC, Q

IC401

IC701

IC201

Q102
Q101

5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

  Chip Resistor

  RS1/○S○○○J,RS1/○○S○○○J

  Chip Capacitor (except for CQS.....)

  CKS....., CCS....., CSZS.....

=====Circuit Symbol and No.===Part Name　Part No.

A Unit Number : HWM0086
Unit Name : Mother Unit

MISCELLANEOUS

Symbol	No.	Part Name	Part No.
IC	101	IC	PML010A
IC	201	IC	TDA7384
IC	202	IC	NJM2904V
IC	203	IC	NJM2904V
IC	301	IC	NJM2068V
IC	302	IC	NJM2068V
IC	601	IC	PD5756A
IC	603	IC	TC7S86F
IC	604	IC	BR9010FV-W
IC	801	IC	S-80842CNDYI
Q	201	Transistor	DTC124EU
Q	202	Transistor	DTC124EU
Q	231	Transistor	DTC114EU
Q	321	Transistor	2SC4081
Q	322	Transistor	2SC4081
Q	323	Transistor	2SC4081
Q	324	Transistor	2SC4081
Q	325	Transistor	2SC4081
Q	326	Transistor	2SC4081
Q	327	Transistor	2SC4081
Q	328	Transistor	2SC4081
Q	329	Transistor	2SC4081
Q	330	Transistor	2SC4081
Q	410	Transistor	2SC4081
Q	691	Transistor	DTA114EU
Q	692	Transistor	DTC124EU
Q	700	Transistor	KSD1273
Q	701	Transistor	2SA1576
Q	702	Transistor	DTC114EU
Q	804	Transistor	2SB1236
Q	805	Transistor	KSB1366
Q	806	Transistor	IMX1
Q	807	Transistor	2SC4081
Q	808	Transistor	2SD2318F5
Q	809	Transistor	2SA1576
Q	810	Transistor	DTC114EU
Q	821	Transistor	2SB942A
Q	822	Transistor	2SC4081
Q	823	Transistor	2SC4081
Q	824	Transistor	KSA1220
Q	825	Transistor	2SC4081
Q	826	Transistor	2SC4081
Q	827	Transistor	2SA1576
Q	840	Transistor	2SC4081
Q	841	Transistor	2SC4081
Q	850	Transistor	DTA144EU
Q	851	Transistor	2SC4081
Q	852	Transistor	2SC4081
Q	870	Transistor	DTA124EU
Q	871	Transistor	2SC4081
Q	872	Transistor	2SC4081
Q	873	Transistor	2SA1576
Q	874	Transistor	DTC114EU
D	201	Diode	DAN202U
D	202	Diode	DAN202U
D	700	Diode	HZS9L(B1)
D	801	Diode	RM4Z-LFJ4
D	802	Diode	ERA15-02VH
D	805	Diode	HZS9L(A1)
D	806	Diode	ERA15-02VH
D	807	Diode	HZS6L(B2)
D	830	Diode	1SS355
D	840	Diode	HZS7L(C2)
D	841	Diode	HZS9L(A2)
D	850	Diode	UDZS5R6(B)
D	851	Diode	DAN202U
D	852	Diode	HZS9L(B2)
D	873	Diode	HZS12L(C1)
D	874	Diode	1SS133
D	875	Diode	MA732
L	101	Inductor	LAU2R2K
L	410	Ferri-Inductor	LAU4R7K
L	411	Coil	CTB1103
L	412	Inductor	LAU2R2K
L	413	Inductor	LAU2R2K
L	601	Inductor	LCTA2R2J2520
L	603	Inductor	HTF0002
L	604	Inductor	HTF0002
L	616	Inductor	HTF0002
L	620	Inductor	HTF0002
L	801	Choke Coil 600μH	CTH1243
TH	601	Thermistor	CCX1032
X	601	Radiator 16.000MHz	CSS1571
X	602	Radiator 32.768kHz	CSS1319
EF	801	EMI Filter	HCG0001
AR	410	Surge Protector	DSP-201M-S00B
		FM/AM Tuner Unit	CWE1561

RESISTORS

Symbol	No.	Part Name	Part No.
R	117		RS1/16S682J
R	118		RS1/16S682J
R	121		RS1/16S0R0J
R	122		RS1/16S0R0J
R	123		RS1/16S302J
R	124		RS1/16S302J
R	125		RS1/16S132J
R	126		RS1/16S132J
R	201		RS1/16S103J
R	202		RS1/16S221J
R	203		RS1/16S153J
R	204		RS1/16S101J
R	205		RS1/16S103J
R	206		RS1/16S0R0J
R	231		RS1/16S103J

=====Circuit Symbol and No.===Part Name		Part No.
R	232	RS1/16S103J
R	233	RS1/16S103J
R	234	RS1/16S103J
R	235	RS1/16S103J
R	236	RS1/16S103J
R	237	RS1/16S103J
R	238	RS1/16S103J
R	239	RAB4C682J
R	245	RAB4C821J
R	281	RS1/16S0R0J
R	282	RS1/16S0R0J
R	311	RS1/16S0R0J
R	312	RS1/16S0R0J
R	315	RS1/16S0R0J
R	316	RS1/16S0R0J
R	321	RS1/16S512J
R	322	RS1/16S512J
R	325	RS1/16S822J
R	326	RS1/16S822J
R	327	RS1/16S122J
R	328	RS1/16S122J
R	329	RS1/16S683J
R	330	RS1/16S683J
R	331	RS1/16S472J
R	332	RS1/16S472J
R	333	RS1/16S562J
R	334	RS1/16S562J
R	337	RS1/16S122J
R	338	RS1/16S122J
R	339	RS1/16S683J
R	340	RS1/16S683J
R	341	RS1/16S472J
R	342	RS1/16S472J
R	343	RS1/16S0R0J
R	344	RS1/16S0R0J
R	347	RS1/16S122J
R	348	RS1/16S122J
R	349	RS1/16S683J
R	350	RS1/16S683J
R	351	RS1/16S472J
R	352	RS1/16S472J
R	355	RS1/16S272J
R	356	RS1/16S272J
R	357	RS1/16S122J
R	358	RS1/16S122J
R	359	RS1/16S683J
R	360	RS1/16S683J
R	361	RS1/16S472J
R	362	RS1/16S472J
R	363	RS1/16S512J
R	364	RS1/16S512J
R	367	RS1/16S512J
R	368	RS1/16S512J
R	369	RS1/16S182J
R	370	RS1/16S182J
R	373	RS1/16S122J
R	374	RS1/16S122J
R	375	RS1/16S683J
R	376	RS1/16S683J
R	377	RS1/16S472J
R	378	RS1/16S472J
R	389	RS1/16S512J
R	390	RS1/16S512J
R	410	RS1/16S222J
R	412	RS1/16S222J
R	413	RS1/16S473J
R	414	RS1/16S681J
R	415	RS1/16S681J
R	416	RS1/16S681J
R	417	RS1/16S473J

=====Circuit Symbol and No.===Part Name		Part No.
R	418	RS1/16S472J
R	419	RS1/16S473J
R	420	RS1/16S681J
R	421	RS1/16S473J
R	422	RS1/16S473J
R	423	RS1/16S473J
R	424	RS1/16S681J
R	425	RS1/16S681J
R	426	RS1/16S103J
R	427	RS1/16S393J
R	430	RS1/16S563J
R	601	RS1/16S471J
R	602	RS1/16S102J
R	603	RAB4C102J
R	604	RS1/16S473J
R	605	RS1/16S471J
R	606	RS1/16S102J
R	612	RS1/16S473J
R	614	RS1/16S102J
R	615	RS1/16S102J
R	616	RS1/16S471J
R	619	RS1/16S0R0J
R	620	RS1/16S471J
R	621	RAB4C102J
R	622	RS1/16S0R0J
R	624	RS1/16S0R0J
R	626	RS1/16S102J
R	628	RAB4C0R0J
R	629	RAB4C102J
R	631	RS1/16S473J
R	633	RS1/16S0R0J
R	634	RS1/16S471J
R	636	RS1/16S0R0J
R	637	RS1/16S102J
R	638	RS1/16S102J
R	640	RS1/16S472J
R	644	RAB4C471J
R	646	RS1/16S102J
R	647	RS1/16S102J
R	649	RAB4C102J
R	650	RS1/16S102J
R	651	RAB4C103J
R	652	RS1/16S473J
R	653	RS1/16S102J
R	655	RS1/16S333J
R	656	RS1/16S471J
R	657	RS1/16S102J
R	658	RS1/16S101J
R	661	RS1/16S0R0J
R	662	RS1/16S102J
R	663	RS1/16S0R0J
R	664	RAB4C222J
R	665	RS1/16S303J
R	666	RAB4C102J
R	668	RS1/16S473J
R	674	RS1/16S184J
R	675	RS1/16S103J
R	676	RS1/16S103J
R	677	RS1/16S222J
R	678	RS1/16S222J
R	679	RS1/16S104J
R	697	RAB4C102J
R	698	RS1/16S473J
R	699	RS1/16S473J
R	700	RS1/16S223J
R	701	RS1/16S103J
R	702	RD1/4PU331J
R	703	RS1/16S103J
R	704	RS1/16S103J
R	705	RS1/16S0R0J

=====Circuit Symbol and No.===Part Name			Part No.
R	721		RS1/16S272J
R	722		RS1/16S272J
R	751		RD1/4PU0R0J
R	801		RD1/4PU102J
R	807		RS1/16S472J
R	809		RD1/4PU331J
R	810		RS1/16S272J
R	811		RS1/16S103J
R	812		RS1/16S332J
R	813		RS1/16S132J
R	814		RD1/4PU271J
R	815		RS1/16S471J
R	816		RS1/16S222J
R	817		RD1/4PU102J
R	818		RS1/16S103J
R	819		RS1/16S105J
R	820		RS1/16S221J
R	821		RS1/16S222J
R	822		RS1/16S222J
R	823		RS1/16S221J
R	824		RS1/16S471J
R	825		RS1/16S105J
R	826		RS1/16S222J
R	827		RS1/16S331J
R	828		RS1/16S152J
R	829		RS1/16S331J
R	830		RS1/16S102J
R	831		RS1/16S822J
R	833		RD1/4PU1R8J
R	834		RS1/16S102J
R	841		RS1/16S473J
R	842		RS1/16S473J
R	843		RS1/16S473J
R	844		RS1/16S473J
R	845		RS1/16S473J
R	846		RS1/16S473J
R	850		RS1/16S472J
R	851		RS1/16S472J
R	852		RD1/4PU102J
R	853		RS1/16S472J
R	854		RS1/16S102J
R	855		RS1/16S472J
R	870		RD1/4PU102J
R	871		RS1/16S0R0J
R	872		RS1/16S104J
R	873		RS1/16S472J
R	874		RS1/16S473J
R	875		RS1/16S473J
R	876		RS1/16S473J
R	877		RS1/16S473J
R	878		RS1/16S0R0J
R	879		RS1/16S472J
R	880		RS1/16S473J
R	883		RD1/4PU331J
R	891		RS1/16S152J
R	892		RS1/16S152J
R	893		RS1/16S0R0J
R	895		RS1/16S103J
R	896		RS1/16S103J

CAPACITORS

=====Circuit Symbol and No.===Part Name			Part No.
C	101		CKSRYB104K25
C	102		CEJQ470M10
C	103		CEJQ100M16
C	104		CKSRYB104K25
C	115		CKSRYB474K10
C	116		CKSRYB474K10
C	117		CKSRYB474K10
C	118		CKSRYB474K10
C	119		CKSRYB474K10
C	120		CKSRYB474K10
C	125		CKSRYB272K50
C	126		CKSRYB272K50
C	129		CKSRYB104K16
C	130		CKSRYB104K16
C	201		CEJQ330M10
C	202		CEJQ010M50
C	203		CFTLA105J50
C	204		CEJQ100M16
C	205		CKSRYF104Z25
C	211		CFTNA224J50
C	212		CFTNA224J50
C	213		CFTNA224J50
C	214		CFTNA224J50
C	221		CKSRYB102K50
C	222		CKSRYB102K50
C	223		CKSRYB102K50
C	224		CKSRYB102K50
C	225		CKSRYB102K50
C	226		CKSRYB102K50
C	227		CKSRYB102K50
C	228		CKSRYB102K50
C	302		CKSRYB104K25
C	303		CKSRYB104K25
C	311		CEJQ100M16
C	312		CEJQ100M16
C	315		CEJQ100M16
C	316		CEJQ100M16
C	321		CKSRYB474K10
C	322		CKSRYB474K10
C	323		CKSRYB154K10
C	324		CKSRYB154K10
C	325		CKSRYB104K16
C	326		CKSRYB104K16
C	327		CKSRYB393K25
C	328		CKSRYB393K25
C	329		CKSRYB103K50
C	330		CKSRYB103K50
C	331		CKSRYB153K25
C	332		CKSRYB153K25
C	333		CKSRYB103K50
C	334		CKSRYB103K50
C	335		CKSRYB392K50
C	336		CKSRYB392K50
C	337		CCSRCH121J50
C	338		CCSRCH121J50
C	367		CKSRYB474K10
C	368		CKSRYB474K10
C	369		CKSRYB153K25
C	370		CKSRYB153K25
C	375		CCSRCH121J50
C	376		CCSRCH121J50
C	410		CKSQYB103K50
C	411		CKSRYB103K50
C	413		CKSRYB103K50
C	414		CEJQ220M10
C	417		CEJQ101M6R3
C	418		CKSRYB103K50
C	419		CKSRYB183K50
C	420		CKSRYB183K50
C	421		CKSRYB472K50
C	423		CKSRYB682K50
C	424		CKSRYB392K50
C	601		CCSRCH220J50
C	602		CCSRCH180J50
C	603		CEJQ100M16
C	604		CCSRCH101J50
C	607		CCSRCH220J50
C	608		CCSRCH220J50
C	630		CKSRYB102K50
C	658		CKSRYB104K25

Circuit Symbol	No.	Part Name	Part No.
C	661		CKSRYB681K50
C	662		CKSRYB681K50
C	692		CKSRYB104K25
C	700		CKSRYB102K50
C	701		CKSRYB473K50
C	702		CEJQ101M10
C	705		CEJQ100M16
C	706		CEJQ100M16
C	731		CEJQ101M16
C	801	4700μF/16V	HCH0015
C	803		CKSRYB223K50
C	804		CEJQ100M16
C	805		CKSRYB102K50
C	807		CEJQ220M10
C	808		CKSRYB473K50
C	809	1000μF/16V	CCH1149
C	810		CKSRYB103K50
C	820		CEJQ101M10
C	821		CKSRYB472K50
C	822		CKSRYB223K50
C	823		CEJQ100M16
C	824		CKSRYB102K50
C	830		CEJQ2R2M50
C	850		CKSRYB221K50
C	851		CKSRYB102K50
C	870		CCSRCH181J50
C	871		CKSRYB102K50
C	872		CKSRYB102K50
C	873		CKSRYB473K50
C	880		CKSRYB472K50

B Unit Number : HWM0087
Unit Name : Keyboard Unit

MISCELLANEOUS

Circuit Symbol	No.	Part Name	Part No.
IC	901	IC	LC75813E
Q	901	Transistor	DTC114EU
Q	902	Transistor	DTC114EU
Q	904	Transistor	DTC114EU
Q	906	Transistor	DTA114EU
D	911	LED	SML-310PT(KL)
D	912	LED	SML-310PT(KL)
D	913	LED	SML-310PT(KL)
D	914	LED	SML-310PT(KL)
D	915	LED	SML-310PT(KL)
D	916	LED	SML-310PT(KL)
D	917	LED	SML-310PT(KL)
D	918	LED	SML-310PT(KL)
D	919	LED	SML-310PT(KL)
D	920	LED	SML-310PT(KL)
D	921	LED	SML-310PT(KL)
D	922	LED	SML-310PT(KL)
D	923	LED	SML-310PT(KL)
D	924	LED	SML-310PT(KL)
D	925	LED	SML-310PT(KL)
D	926	LED	SML-310PT(KL)
D	927	LED	SML-310PT(KL)
D	928	LED	SML-310PT(KL)
D	929	LED	SML-310PT(KL)
D	930	LED	SML-310PT(KL)
D	931	LED	SML-310PT(KL)
D	932	LED	SML-310PT(KL)
D	933	LED	SML-310PT(KL)
D	934	LED	SML-310PT(KL)
D	935	LED	SML-310PT(KL)
D	936	LED	SML-310PT(KL)
D	937	LED	SML-310PT(KL)
D	938	LED	SML-310PT(KL)
D	939	LED	SML-310PT(KL)
D	940	LED	SML-310PT(KL)
D	941	Chip LED	SML010PT(KL)
D	942	Chip LED	SML010PT(KL)
D	943	LED	SML-310PT(KL)
D	944	LED	SML-310PT(KL)
D	945	LED	SML-310PT(KL)
D	946	LED	SML-310PT(KL)
D	947	LED	SML-310PT(KL)
D	948	LED	SML-310PT(KL)
D	951	Diode	DAN202U(KL)
D	953	Diode	1SS355
D	954	Diode	1SS355
D	955	Diode	1SS355
D	956	Diode	1SS355
L	900	Inductor	LCTB2R2K1608
IL	901	Lamp 8V 105mA	CEL1747
IL	902	Lamp 8V 105mA	CEL1747
VR	901	Encoder(VOLUME/POWER)	CSD1073
LCD	904	LCD	CAW1822

RESISTORS

Circuit Symbol	No.	Part Name	Part No.
R	901		RS1/16S473J
R	902		RS1/16S472J
R	903		RS1/16S472J
R	904		RS1/16S472J
R	905		RS1/16S471J
R	906		RS1/16S471J
R	907		RS1/16S471J
R	908		RS1/16S471J
R	921		RS1/16S181J
R	922		RS1/16S181J
R	923		RS1/16S181J
R	924		RS1/16S181J
R	925		RS1/16S181J
R	926		RS1/16S181J
R	927		RS1/16S181J
R	928		RS1/16S181J
R	929		RS1/16S181J
R	930		RS1/16S181J
R	931		RS1/16S181J
R	932		RS1/16S181J
R	933		RS1/16S181J
R	934		RS1/16S181J
R	935		RS1/16S181J
R	936		RS1/16S181J
R	937		RS1/16S181J
R	938		RS1/16S181J
R	939		RS1/16S181J
R	940		RS1/16S181J
R	941		RS1/16S181J
R	942		RS1/16S181J
R	943		RS1/16S181J
R	944		RS1/16S181J
R	945		RS1/16S181J
R	946		RS1/16S181J
R	947		RS1/16S181J
R	948		RS1/16S181J
R	949		RS1/16S181J
R	950		RS1/16S181J
R	951		RS1/16S151J
R	952		RS1/16S151J
R	953		RS1/16S181J
R	954		RS1/16S181J
R	955		RS1/16S181J
R	956		RS1/16S181J
R	957		RS1/16S181J
R	958		RS1/16S181J

=====Circuit Symbol and No.===Part Name			Part No.

CAPACITORS

C	901		CKSRYB104K16
C	902		CCSRCH681J50
C	903		CKSRYB104K16
C	904		CKSRYB104K16
C	905		CKSRYB104K25

C Unit Number : CWX2701
Unit Name : CD Control Unit

MISCELLANEOUS

IC	101	IC	TA2153FN
IC	201	IC	TC9495F2
IC	401	IC	BA5996FM
IC	701	IC	BA05SFP
Q	101	Transistor	2SD1664
Q	102	Transistor	UMD2N
L	301	Inductor	CTF1546
L	302	Inductor	CTF1546
L	303	Inductor	CTF1546
L	304	Inductor	CTF1546
L	305	Inductor	CTF1546
L	306	Inductor	CTF1546
L	307	Inductor	CTF1546
L	308	Inductor	CTF1546
L	701	Inductor	CTF1546
L	702	Inductor	CTF1546
L	703	Inductor	CTF1546
L	704	Inductor	CTF1546
L	705	Inductor	CTF1546
L	706	Inductor	CTF1546
L	707	Inductor	CTF1546
X	301	Ceramic Resonator 16.934MHz	CSS1525
S	901	Switch(HOME)	CSN1051
S	902	Spring Switch(CLAMP)	CSN1052
S	903	Switch(DSCSNS)	CSN1051
S	904	Spring Switch(12EJ)	CSN1052
S	905	Switch(8EJ)	CSN1051
EF	701	Emi Filter	CCG1051

RESISTORS

R	101		RS1/16S222J
R	102		RS1/8S120J
R	103		RS1/8S100J
R	201		RS1/16S513J
R	202		RS1/16S513J
R	203		RS1/16S9102D
R	204		RS1/16S9102D
R	206		RS1/16S8202D
R	208		RS1/16S124J
R	209		RS1/16S183J
R	210		RS1/16S153J
R	211		RS1/16S103J
R	212		RS1/16S103J
R	213		RS1/16S124J
R	215		RS1/16S0R0J
R	216		RS1/16S471J
R	301		RS1/16S333J
R	302		RS1/16S332J
R	303		RS1/16S332J
R	304		RS1/16S514J
R	306		RS1/16S102J
R	307		RS1/16S102J
R	312		RS1/16S103J
R	313		RS1/16S473J
R	315		RS1/16S334J

=====Circuit Symbol and No.===Part Name			Part No.
R	321		RS1/16S331J
R	323		RS1/16S332J
R	401		RS1/16S684J
R	402		RS1/16S103J
R	403		RS1/16S103J
R	404		RS1/16S183J
R	405		RS1/16S123J
R	407		RS1/16S622J
R	408		RS1/16S622J
R	409		RS1/16S113J
R	410		RS1/16S752J
R	701		RS1/16S102J
R	702		RS1/16S102J
R	703		RS1/16S102J
R	704		RS1/16S102J
R	705		RS1/16S102J
R	706		RS1/16S102J
R	707		RS1/16S102J
R	708		RS1/16S102J
R	709		RS1/16S102J
R	710		RS1/16S102J
R	901		RS1/16S104J
R	902		RS1/16S473J
R	903		RS1/16S273J

CAPACITORS

C	101		CEV470M6R3
C	102		CKSRYB102K50
C	103		CKSRYB104K16
C	104		CKSRYB224K16
C	105		CEV470M6R3
C	106		CKSRYB104K16
C	107		CKSRYB105K6R3
C	201		CKSRYB104K16
C	202		CCSRCH560J50
C	204		CKSRYB224K16
C	205		CKSRYB224K16
C	206		CKSRYB273K25
C	207		CKSRYB273K25
C	208		CKSRYB104K16
C	209		CKSRYB104K16
C	210		CCSRCK2R0C50
C	211		CCSRCH220J50
C	301		CKSRYB153K25
C	302		CKSRYB104K16
C	303		CKSRYB103K50
C	304		CKSRYB103K50
C	305		CKSRYB104K16
C	306		CKSRYB104K16
C	307		CKSRYB333K16
C	308		CKSRYB104K16
C	309		CKSRYB473K16
C	310		CKSRYB473K16
C	311		CKSRYB104K16
C	312		CKSRYB104K16
C	313		CKSRYB103K50
C	315		CEV220M6R3
C	317		CKSRYB104K16
C	318		CKSRYB104K16
C	319		CKSRYB104K16
C	320		CCSRCH470J50
C	325		CKSRYB471K50
C	328		CKSRYB472K50
C	329		CKSRYB104K16
C	330		CKSRYB104K16
C	331		CKSRYB104K16

=====Circuit Symbol and No.===Part Name			Part No.
C	332		CKSRYB103K50
C	401		CKSRYB221K50
C	402		CKSRYB221K50
C	403		CKSRYB153K25
C	404		CKSRYB103K50
C	405		CEV101M10
C	702		CKSRYB104K16
C	703		CKSRYB104K16
C	801	10µF/10V	CCH1349
C	802		CEV101M10
C	803		CKSRYB224K16

Miscellaneous Parts List

		Pickup Unit(Service)(P9)	CXX1481
M	1	Motor Unit(SPINDLE)	CXB6007
M	2	Motor Unit(LOADING/CARRIAGE)	CXB5903

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1) Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to VREF(approx. 2.1V) instead of GND.
  If VREF and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
  Do not connect the negative probe of the measuring equipment to VREF and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to VREF with the channel 2 negative probe connected to GND.
  Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
  If by accident VREF comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

- The RFI and RFO signals are easy to oscillate because of a wide band. When observing them, insert a resistor of about 1 kΩ to the series.

- This equipment will not guarantee the load ejection operation when the mechanical unit is turned upside down. In particular, if the ejection operation is incorrectly performed and recovery is disabled, the recovery is enabled by resetting a product or turning ACC off to on.

2) Test Mode

This mode is used for adjusting the CD mechanism module of the device.

- Test mode starting procedure
  Reset while pressing the **4** and **6** keys together.

- Test mode cancellation
  Switch ACC, back-up OFF.

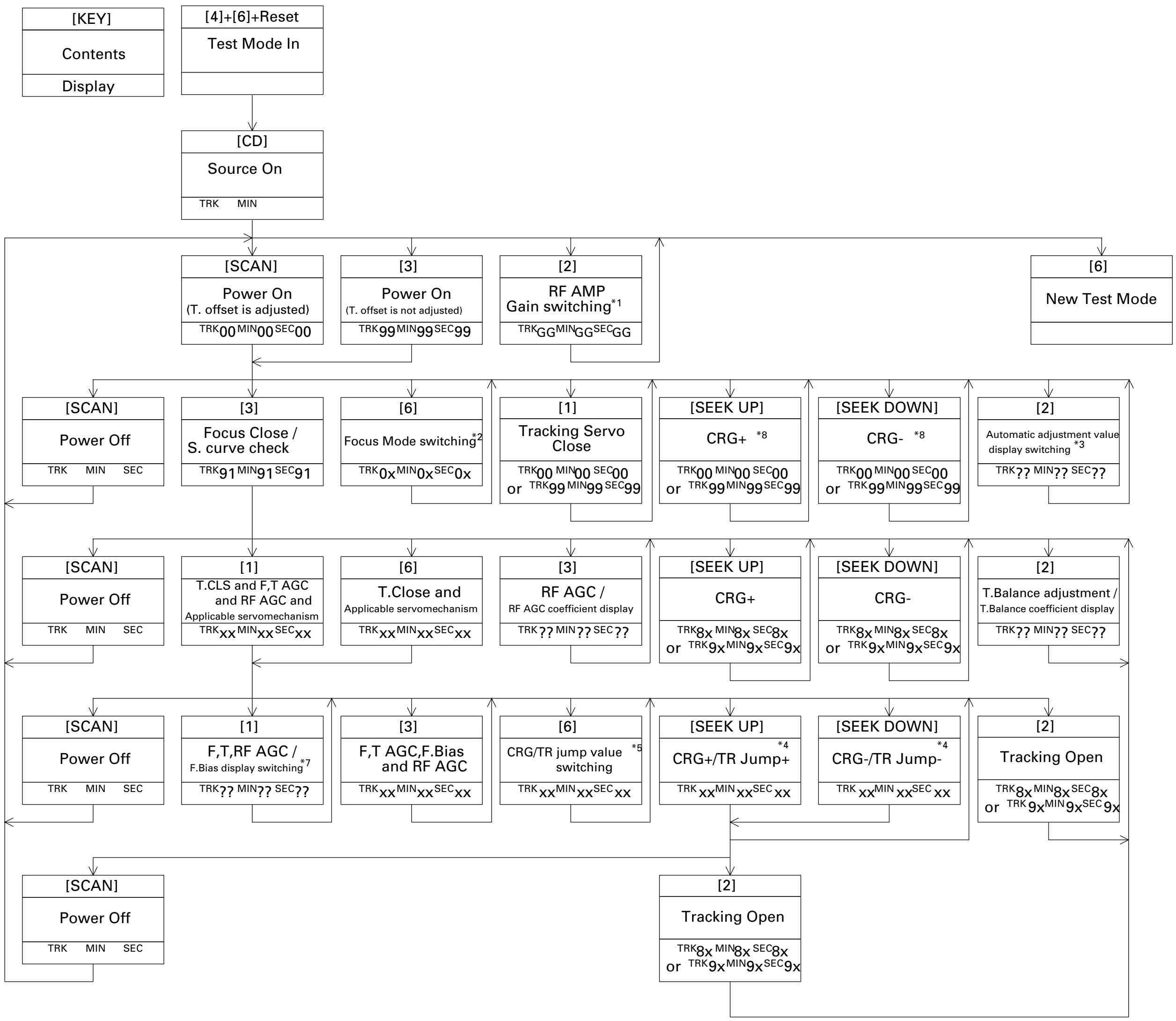
- After pressing the EJECT key, do not press any other key until the disk is completely ejected.

- If the **SEEK UP** or **SEEK DOWN** key is pressed while focus search is in progress, immediately turn the power off (otherwise the actuator may be damaged due to adhesion of the lenses).

- Jump operation of TRs other than 100TR continues after releasing the key. CRG move and 100TR jump operations are brought into the “Tracking close” status when the key is released.

- Powering Off/On resets the jump mode to “Single TR(91)”, the RF AMP gain setting to 0 dB, and the automatic adjustment value to the initial value.

Flow Chart



*1) TYP (TRK MIN SEC) → +12dB (TRK12 MIN12 SEC12) ↩

*2) Focus Close setting (TRK00 MIN00 SEC00 or TRK99 MIN99 SEC99) → S. curve check setting (TRK01 MIN01 SEC01) → F. EQ measurement setting (TRK02 MIN02 SEC02) ↩

*3) F.Offset Display → T.Offset Display → Switch to the order of the original display ↩

*4) 1TR/32TR/100TR

*5 Single TR (TRK91 MIN91 SEC91 or TRK81 MIN81 SEC81) → 32TR (TRK92 MIN92 SEC92 or TRK82 MIN82 SEC82) → 100TR (TRK93 MIN93 SEC93 or TRK83 MIN83 SEC83) → CRG Move (TRK94 MIN94 SEC94 or TRK84 MIN84 SEC84)

*6) Only at the time of CRG move or 100TR jump

*7) TRK/MIN/SEC → F.AGC Gain → T.AGC Gain → F.Bias → RF AGC Gain ↩

*8) CRG motor voltage = 2 [V]

[Key]	Operation	
	Test Mode	New Test Mode
[SCAN]	Power On/Off	Error occurrence time/ cause display switching
[SEEK UP]	CRG +/TR Jump+ (Direction of the external surface)	TRK+/FF
[SEEK DOWN]	CRG -/TR Jump- (Direction of the internal surface)	TRK-/REV
[1]	T.CLS and AGC and Applicable servomechanism/ AGC,AGC display switching	SCAN
[2]	RF Gain switching/Offset adjustment display/ T.Balance adjustment/T.OPN	MODE
[3]	F.CLS,S.Curve/Rough Servo and RF AGC/ F,T,RF AGC	(ITP)
-	SPDL 1X/2X switching (Double-speed compatibility only)	-
-	Error rate measurement	-
[6]	F.Mode switching/T.CLS/CRG,TR Jump switching	Auto/Manual switching

6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

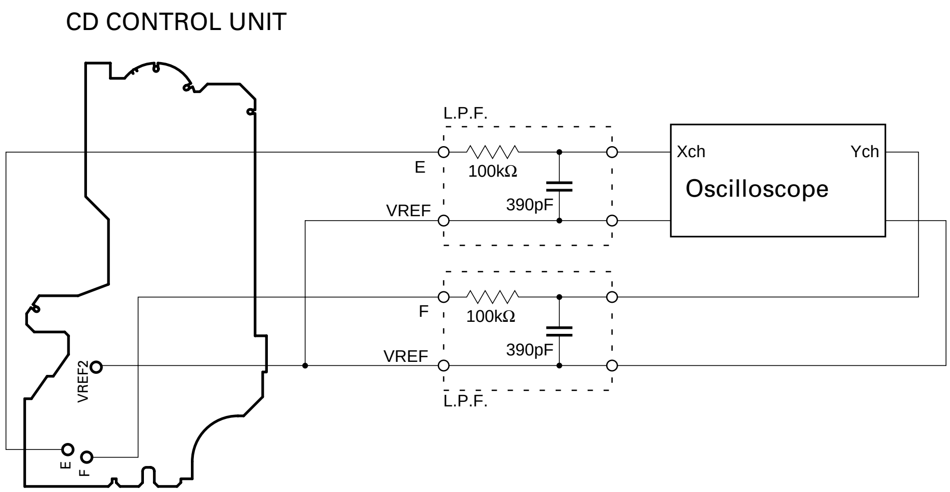
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, VREF2
• Disc	• ABEX TCD-784
• Mode	• TEST MODE



• **Checking Procedure**
1. In test mode, load the disc and switch the 5V regulator on.
2. Using the **SEEK UP** and **SEEK DOWN** buttons, move the PU unit to the innermost track.
3. Press key **3** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **3**. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

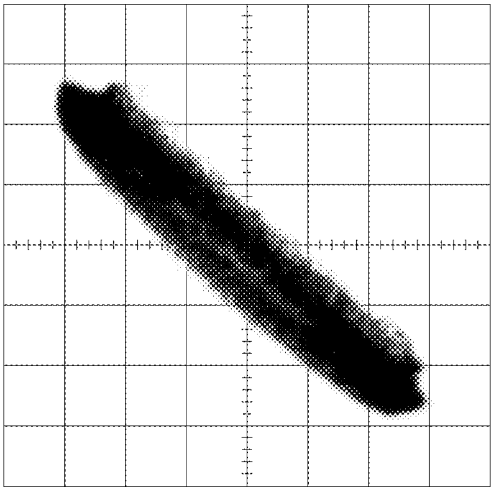
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

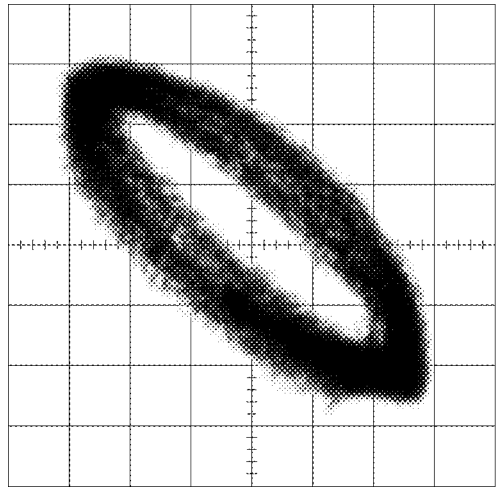
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

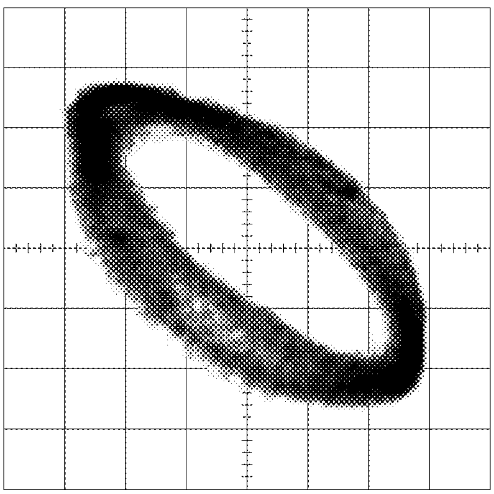
0°



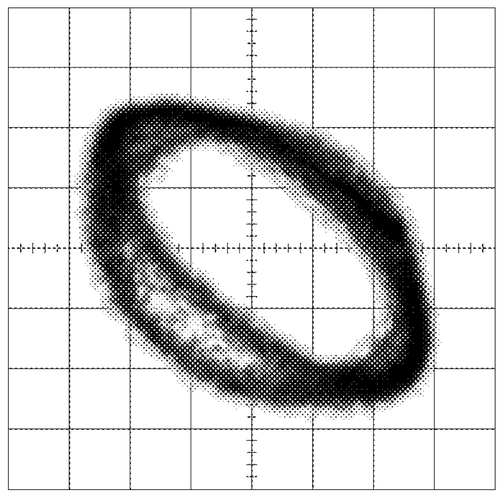
30°



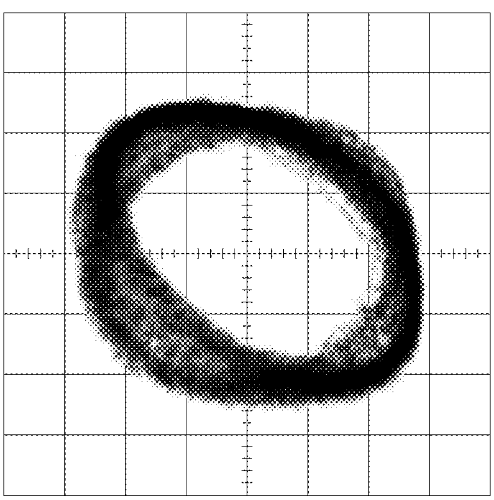
45°



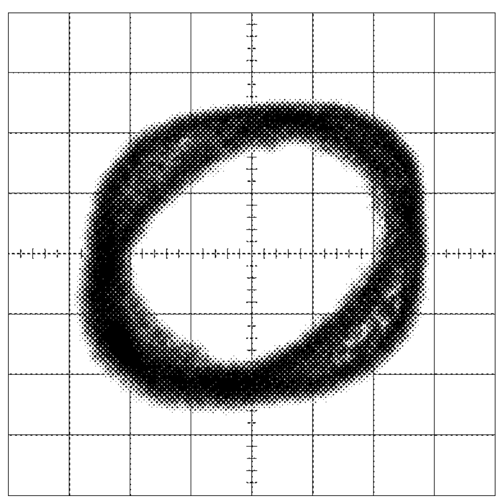
60°



75°



90°



6.3 TEST MODE

● Error Messages

If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

(1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

2) Head unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.

8-digit display	6-digit display	4-digit display
ERROR–xx	ERR–xx	E–xx

(2) Error Code List

Code	Class	Displayed error code	Description of the code and potential cause(s)
10	Electricity	Carriage Home NG SERVO LSI Communication Error	CRG can't be moved to inner diameter. CRG can't be moved from inner diameter. → Failure on home switch or CRG move mechanism. Communication error between microcomputer and SERVO LSI.
11	Electricity	Focus Servo NG	Focusing not available. → Stains on rear side of disc or excessive vibrations on REWRITABLE.
12	Electricity	Spindle Lock NG Subcode NG	Spindle not locked. Sub-code is strange (not readable). → Failure on spindle, stains or damages on disc, or excessive vibrations. A disc not containing CD-R data is found. Turned over disc are found, though rarely. CD signal error.
17	Electricity	Setup NG	AGC protection doesn't work. Focus can be easily lost. → Damages or stains on disc, or excessive vibrations on REWRITABLE.
30	Electricity	Search Time Out	Failed to reach target address. → CRG tracking error or damages on disc.
44	Electricity	ALL Skip	Skip setting for all track. (CD-R/RW)
50	Mechanism	CD On Mech Error	Mechanical error during CD ON. → Defective loading motor, mechanical lock and mechanical sensor.
A0	System	Power Supply NG	Power (VD) is ground faulted. → Failure on SW transistor or power supply (failure on connector).

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).
Unreadable TOC does not constitute an error. An intended operation continues in this case.
Upper digits of an error code are subdivided as shown below:
1x: Setup relevant errors, 3x: Search relevant errors, Ax: Other errors.

● New Test Mode

S-CD plays the same way as before.
If an error such as off focus, spindle unlocking, unreadable sub-code, or sound skipping occurs after setup, its cause and time occurred (in absolute time) are displayed.
During setup, operational status of the control software is displayed.
These displays and functions are prepared for enhancing aging in the servicing and efficiency of trouble analysis.

(1) Shifting to the New Test Mode

① Turn on the current test mode by starting the reset from the key.

② Select S-CD for the source through the specified procedure including use of the [CD] key, and inserting the disc. Then, press the [Jump Mode Selector] key while maintaining the regulator turned off.

③ After the above operations, the new test mode remains on irrespective of whether the S-CD is turned on or off. You can reset the new test mode by turning on the reset start.

(2) Key Correspondence

Key	Test mode		New test mode	
	Regulator Off	Regulator On	In-play	Error Production
SCAN	To regulator on	To regulator off	–	Time/Err.No. switching
SEEK UP	–	FWD-Kick	FF/TR+	–
SEEK DOWN	–	REV-Kick	REV/TR-	–
1	–	Tracking Close	Scan	–
2	–	Tracking Open	Mode	–
3	–	Focus Close	–	–
–	–	Focus Open	–	–
–	–	Jump Off	–	–
6	To new test mode	Jump mode switching	Auto/Manu	–

Note: Eject and CD on/off is performed in the same procedure as that for the normal mode.

(3) Cause of Error and Error Code

Code	Class	Contents	Description and cause
40	Electricity	Off focus detected.	FOK goes low. → Damages/stains on disc, vibrations or failure on servo.
41	Electricity	Spindle unlocked.	LOCK = Low continued for 150 msec. → Damages/stains on disc, vibrations or failure on servo.
42	Electricity	Sub-code unreadable.	Sub-code was unreadable for 500 msec. → Damages/stains on disc, vibrations or failure on servo.
43	Electricity	Sound skipping detected.	Last address memory function was activated. → Damages/stains on disc, vibrations or failure on servo.

Note: Mechanical errors during aging are not displayed.

(4) Display of Operational Status during Setup

Status No.	Contents	Protective action
21	Focus search start	Focus search timeout.
22	Focus search 2	Focus search timeout.
23	Focus search 3	Focus search timeout.
24	Focus search 4	Focus search timeout.
25	Focus search(Setup protection)	Focus slips off.
26	Focus search(Fast recovery)	Focus slips off.
27	RF detection	Focus slips off.
28	Spindle rough servocontrol	Focus slips off.
29	Tracking balance adjustment start	Focus slips off.
30	Tracking balance adjustment 2	Focus slips off.
31	Tracking balance adjustment 3	Focus slips off.
32	Tracking close start(Spindle stationary servocontrol setting)	Focus slips off.
33	Tracking close 2	Focus slips off.
34	Tracking close 3	Focus slips off.
35	Focus/Tracking AGC start	Focus slips off.
36	Focus/Tracking AGC 2	Focus slips off.
37	Focus/Tracking AGC 3	Focus slips off.
38	Focus/Tracking AGC 4	Focus slips off.
39	Focus/Tracking AGC 5	Focus slips off.
40	Focus/Tracking AGC 6	Focus slips off.
41	Focus/Tracking AGC 7	Focus slips off.
42	Focus/Tracking AGC 8	Focus slips off.
43	FE bias start	Focus slips off.
44	FE bias 2	Focus slips off.
45	RF AGC start	Focus slips off.
46	RF AGC 2	Focus slips off.
47	Lock check start	Focus slips off.
48	Lock is being checked	Focus slips off.
49	Subcode check start	Focus slips off, spindle lock is not performed.
50	Subcode is being checked	Focus slips off, no subcode can be read.

(5) Display Examples

1) During Setup

8-digit display, 6-digit display	4-digit display(Auto setting)	4-digit display(Manual setting)
TNO. Min Sec	TNO.	Min Sec
11 11' 11"	11	11' 11"

2) During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

3) When a Protection Error Occurred

(A) Error display ((A)←→(B), (C) : SCAN key)

8-digit display	6-digit display	4-digit display
ERROR-xx	ERR-xx	E-xx

(B) Error occurrence timing display in track no. ((B)←→(C) : Auto/Manual key)

8-digit display, 6-digit display	4-digit display(Auto setting)
TNO. Min Sec	TNO.
10 40' 05"	10

(C) Error occurrence timing display in absolute time. ((B)←→(C) : Auto/Manual key)

8-digit display, 6-digit display	4-digit display(Manual setting)
TNO. Min Sec	Min Sec
10 40' 05"	40' 05"

7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 DISASSEMBLY

● Removing the Case (not shown)

1. Remove the Case.

● Removing the CD Mechanism Module (Fig.1)

1 Remove the four screws.

Disconnect the connector and then remove the CD Mechanism Module.

● Removing the Grille Assy (Fig.1)

2 Remove the two screws and then remove the Grille Assy.

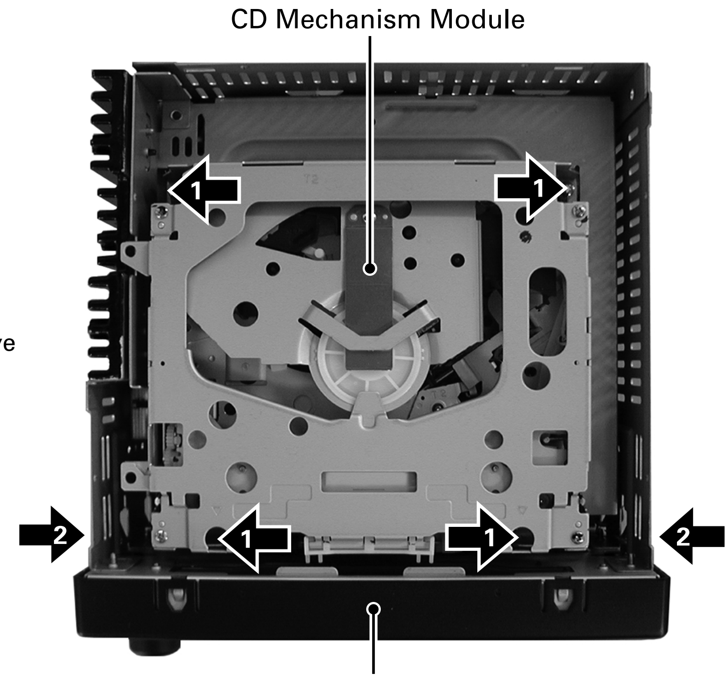


Fig.1

● Removing the Heat Sink (Fig.2)

1 Remove the two screws.

2 Remove the two screws and then remove the Heat Sink.

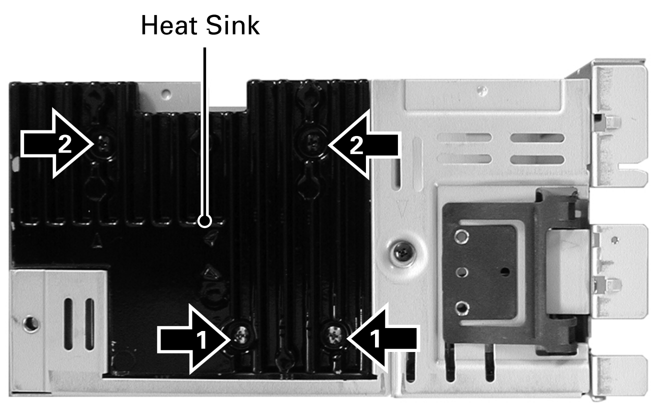


Fig.2

● Removing the Chassis (Fig.3)

1 Remove the four screws and then remove the Chassis.

Fig.3

● Removing the Holder (Fig.4)

1 Remove the four screws and then remove the Holder.

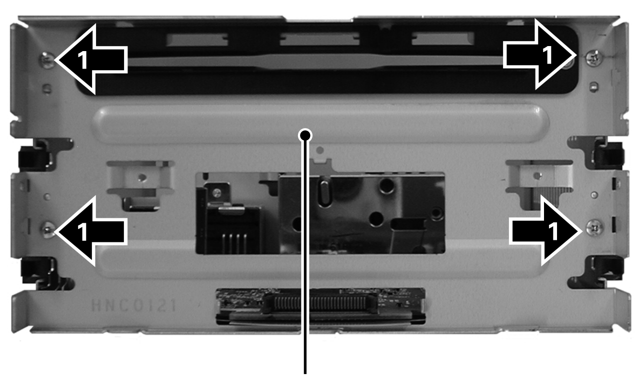


Fig.4

● Removing the Mother Unit (Fig.5)

1. Remove the screw.

2. Remove the two screws.

3. Straighten the tabs at two locations indicated.

4. Remove the two screws and then remove the Mother Unit.

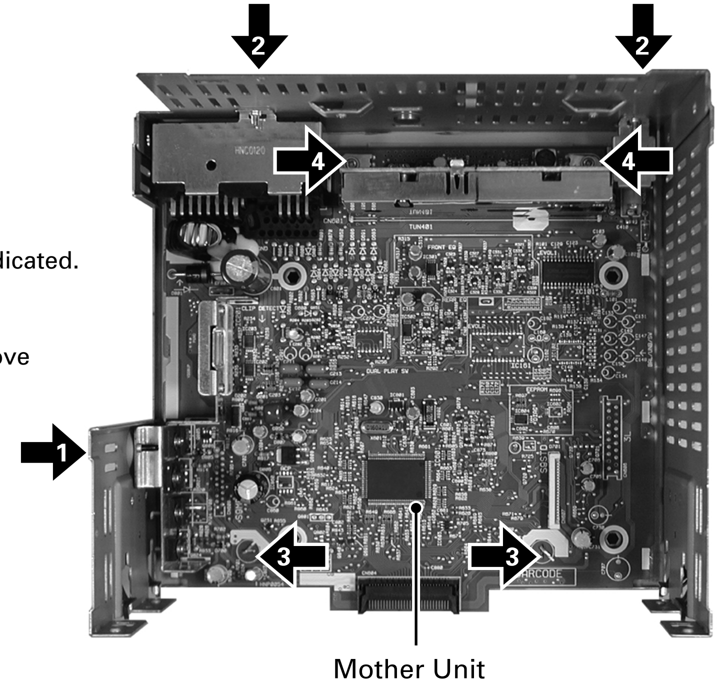
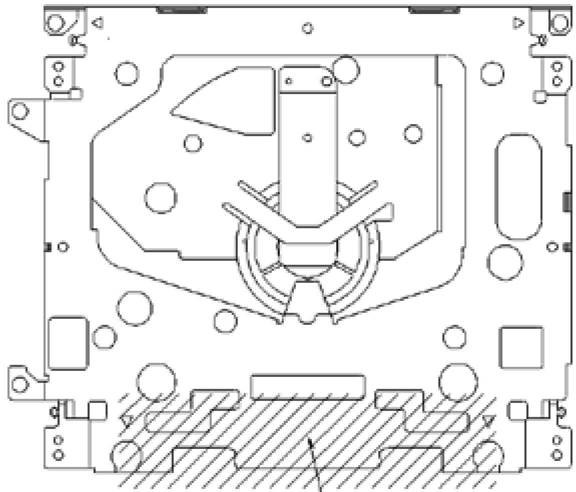


Fig.5

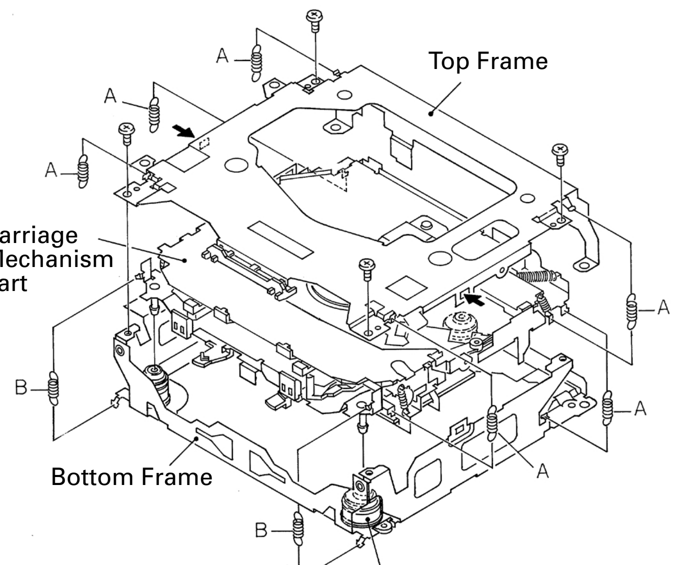
● How to hold the Mechanism Unit

1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



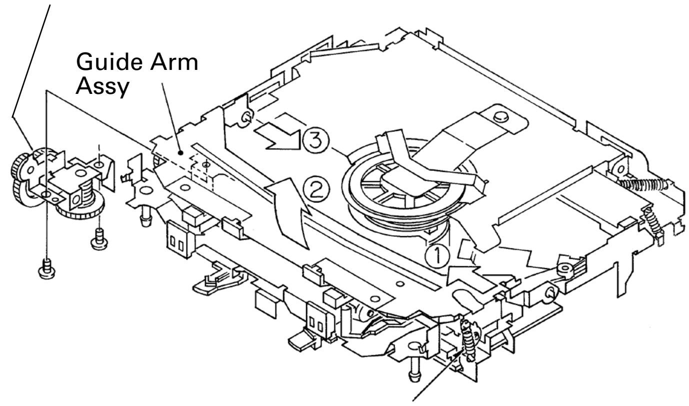
● How to remove the Top and Bottom Frame

1. When the disk is in "clamp" state, unlock Spring A (6 pieces) and Spring B (2 pieces), and unscrew screws (4 pieces).
2. Unlock each 1 of pawl at the both side of the frame, then remove the top frame.
3. Remove the Carriage Mechanism part in such way that; you remove the mechanism part from 3 pieces of Damper while slowly pulling up the part.
4. Now, the top frame has been removed, and under this state, fix the genuine Connector again, and eject the disk.
   (Caution)
   When you reassemble the Carriage Mechanism part, apply a bit of alcohol to Dampers.



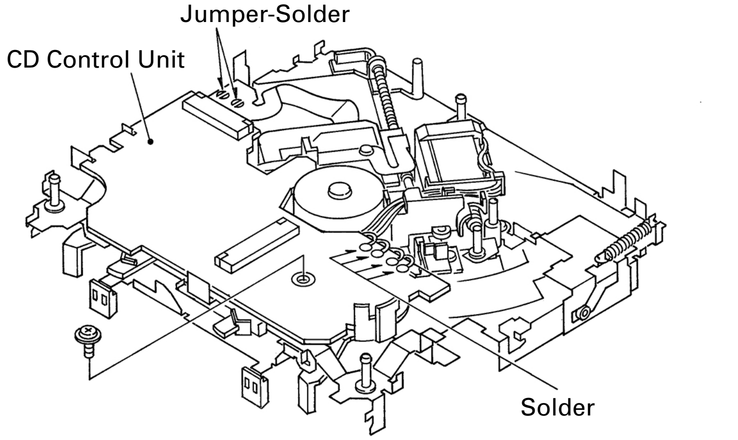
● How to remove the Guide Arm Assy

1. Unlock the spring (1 piece) at the right side of the assembly.
2. Unscrew screws (2 pieces), then remove the Screw Gear Bracket.
3. Shift the Guide Arm Assy to the left and slowly rotate it to the upper direction.
4. When the Guide Arm Assy rotates approximately 45 degree, shift the Assy to the right side direction and remove it.



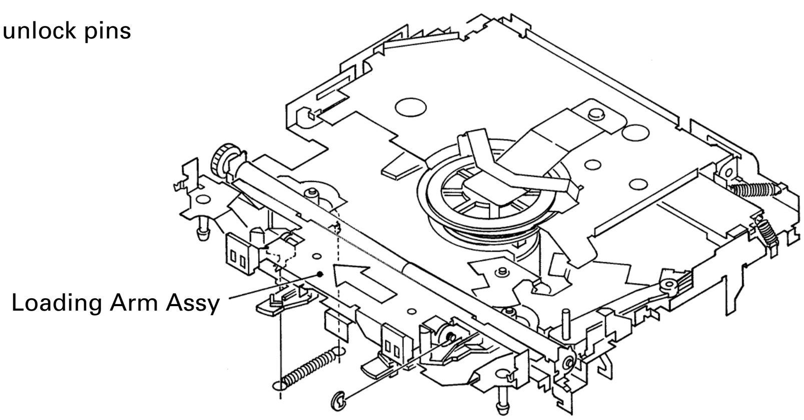
● How to remove the CD Control Unit

1. Give jumper-solder treatment to the Flexible Wire of the Pickup unit, then remove the wire from the Connector.
2. Remove all 4 points of solder-treatment on the Lead Wire. Also, unscrew the screw(1 piece).
3. Then, Remove the CD Control Unit.
   (Caution)
   Be careful not to damage SW when you reassemble the CD Control Unit into the device.



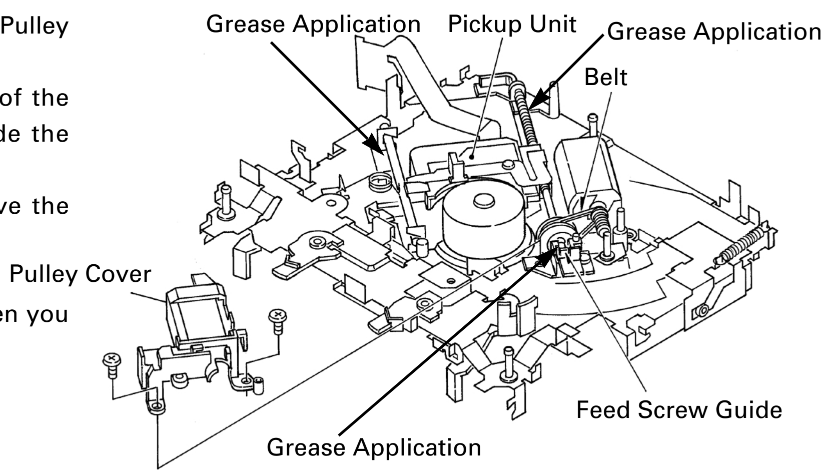
● How to remove the Loading Arm Assy

1. Unlock the spring (1 piece) and remove the E ring (1 piece) of the Fulcrum Shaft.
2. Shift the arm to the left side direction and unlock pins (2 pieces).

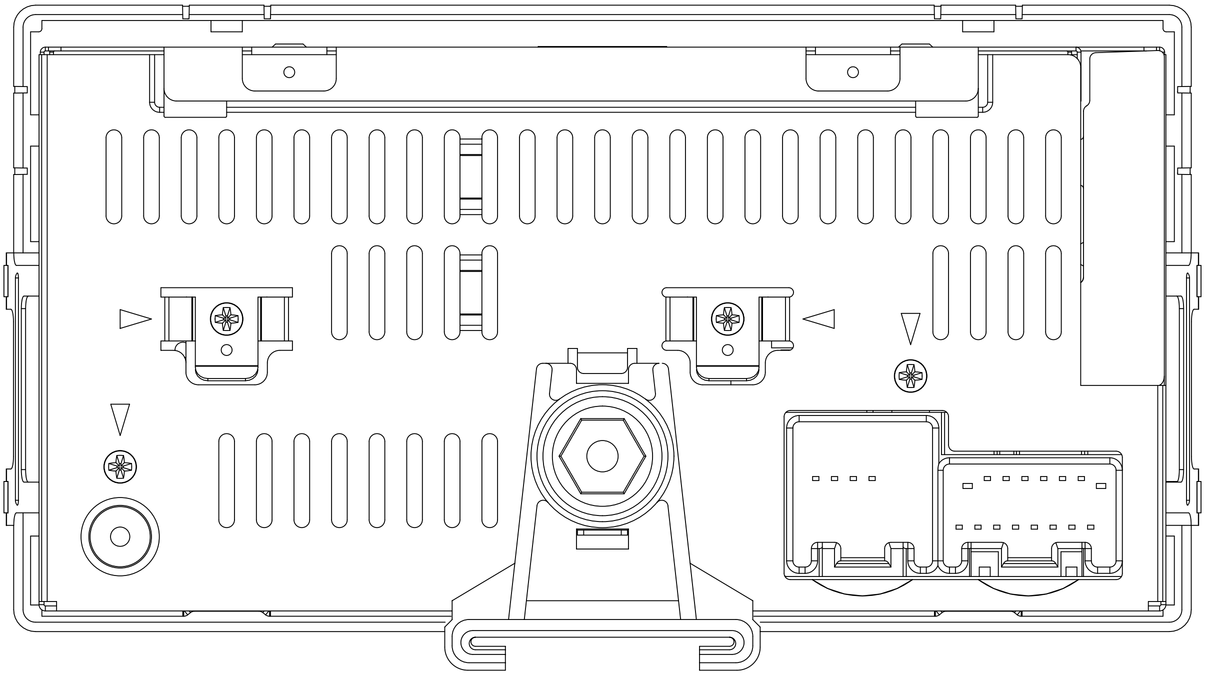


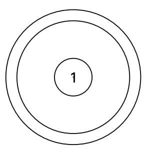
● How to remove the Pickup Unit

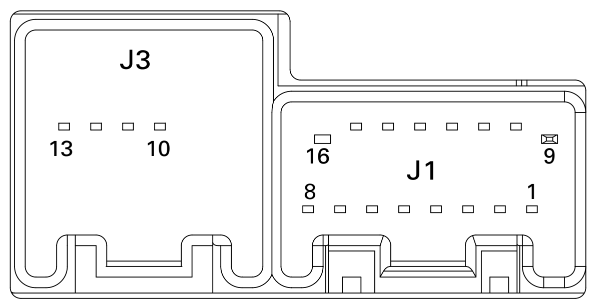
1. Unscrew 2 pieces of screws, then remove the Pulley Cover.
2. Remove the Feed Screw unit from the pawl of the Feed Screw Guide (The pawl is located inside the guide).
3. Remove the belt from the Pulley, then remove the Pickup unit.
   (Caution)
   Make sure not to stain the belt with grease when you fix the belt.



7.1.2 CONNECTOR FUNCTION DESCRIPTION







FM/AM ANTENNA	
1	ANTENNA IN
CASE	RF GND

PHONE	
10	NC(PTA)
11	NC(PHONE INPUT +)
12	NC(PHONE INPUT -)
13	NC(PHONE SHIELD)

POWER SUPPLY,SPEAKER	
1	ILL+
2	ILL-
3	START
4	CLOCK
5	RR+
6	RR-
7	FR+
8	FR-
9	B.UP
10	RUN/ACC
11	RADIO GND
12	RL+
13	RL-
14	FL+
15	FL-
16	POWER AMP GND

7.2 PARTS

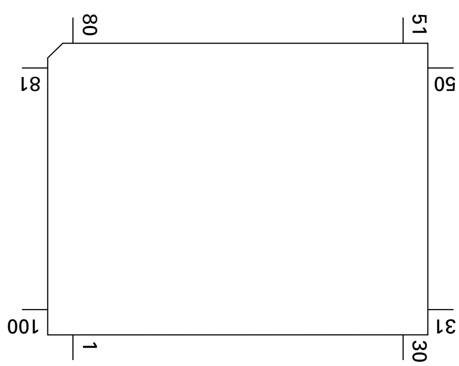
7.2.1 IC

● Pin Functions (PD5756A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	PDO	O	C	Tuner : PLL data output
2	PCK	O	C	Tuner : PLL serial clock output
3	BLPWR	O		LCD back light power output
4	ILMOUT	O		Illumination D/A output
5	LCDDT	O	C	LCD driver : Data output
6	PWMIN	I		Illumination PWM input
7	LCDCLK	O	C	LCD driver : Clock output
8	BYTE			GND
9	CNVSS			GND
10	SUBCLKI	I		Sub clock input
11	SUBCLKO	O		Sub clock output
12	RESET	I		Reset input
13	XOUT	O		Crystal oscillating element connection pin
14	VSS			GND
15	XIN	I		Crystal oscillating element connection pin
16	VCC			Power supply terminal
17	NMI	I		Not used
18	SD	I		Tuner : PLL station detector input
19	ILMINT	I		Illumination interrupt input
20	ROTINT	I		Rotary encoder interrupt input
21	ASENS	I		ACC power sense input
22	LCDCE	O	C	LCD driver : Chip enable output
23	LCDINH	O	C	LCD driver : Inhibit output
24	LEDPWM			Not used
25	SPEED	I		SPEED pulse input
26	ROMCS	O	C	ROM correction chip select output
27	BSENS	I		Back up power sense input
28	BSCK	O	C	P-BUS : Serial clock output
29	BSI	I		P-BUS : Serial data input
30	BSO	O	N	P-BUS : Serial data output
31	ATXD	O	C	ACP-BUS : ACP data output
32	ARXD	I		ACP-BUS : ACP data input
33	EVCE2	O	C	Electronic volume : Chip enable output 2
33	EVCE	O	C	Electronic volume : Chip enable output 1
35	EDT	O	C	Electronic volume : Interface Data output
36	CLOCK	I		Clock defeat input
37	ELCK	O	C	Electronic volume : Clock output
38,39	NC			Not used
40	BRXEN	I/O	/C	P-BUS : Communication enable input / output
41	BSRQ	I		P-BUS : Request input
42	BRST	I		P-BUS : Reset input
43	RSPSW	O	C	Rear speaker switch output
44	SWVDD	O	C	LCD driver : Power supply control output
45	EPCE	O	C	Diagnosis EEPROM : Chip enable output
46	PLLCE	O	C	Tuner : PLL chip enable output
47	ST	I		Tuner : Stereo input
48	LOCL	O	C	Tuner : Local low output
49	PLLCE2	O	C	Tuner : PLL chip enable output 2
50-54	KDT4-KDT0	I		Key data input 4-0
55	RMUTE	O	C	Rear mute output
56	TESTIN	I		Test program mode input
57-61	KST5-KST1	O	N	Key strobe output 5-1
62	VCC			Power supply terminal
63	KST0	O	N	Key strobe output 0
64	VSS			GND
65	CLIPIN	I		Clip detector input
66	RPAIN	I		Reverse perking aid input

Pin No.	Pin Name	I/O	Format	Function and Operation
67	$\overline{\text{WC}}$	O	C	Diagnosis EEPROM : Write control output
68	AUXCNT0	O	C	Aux input selector 1 output
69	NC			Not used
70	$\overline{\text{SYSPWR}}$	O	C	System power output
71	FMUTE	O	C	Front mute output
72	ASYSON	O	C	ACP-BUS : ACP power output
73	$\overline{\text{WAKEUP}}$	I		Wake up key sense input
74	$\overline{\text{PTAIN}}$	I		PTA interrupt input
75	ACPINT	O		ACP-BUS : ACP interrupter output
76	ROTIN0	I		Rotary encoder pulse input 0
77	ROTIN1	I		Rotary encoder pulse input 1
78	CLCONT	O	C	CD : Driver change output
79	VDCONT	O	C	CD : VD power control output
80	CD5VON	I		CD : CD 5V power control output
81	$\overline{\text{XRST}}$	O	C	CD : CD LSI reset output
82	$\overline{\text{XCE}}$	O	C	CD : CD LSI chip enable output
83	XPCK	O	C	CD : CD LSI clock output
84	LOAJ	O	C	CD : Load / Eject direction change output
85-88	XPIO3-0	I/O	/C	CD : LSI data input / output
89	CONT	O	C	CD : Servo driver change output
90	HOME	I		CD : DSCSNS switch sense input
91	DSCSNS	I		CD : HOME switch sense input
92	VDSENS	I		CD : VD sense input
93	TEMP	I		CD : Temperature sense input
94	SWCIN	I		SWC input
95	ILMI	I		Illumination sense input
96	AVSS			GND
97	SL	I		Tuner : SD level input
98	VREF			A/D converter reference voltage terminal
99	AVDD			Power supply terminal
100	PDI	I		Tuner : PLL data input

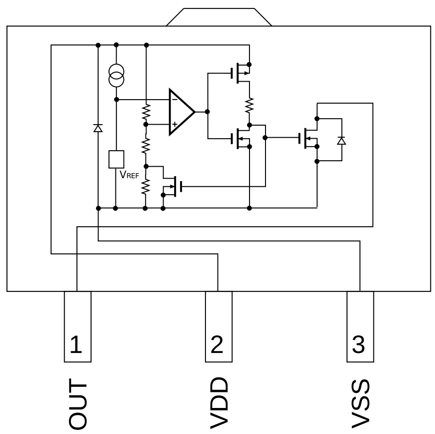
* PD5756A



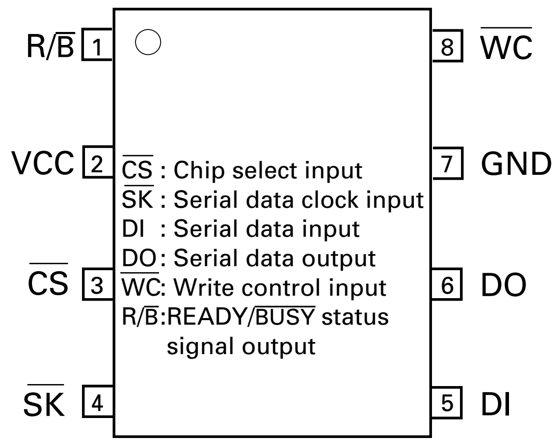
IC's marked by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

Format	Meaning
C	C MOS
N	N channel open drain

* S-80842CNDYI



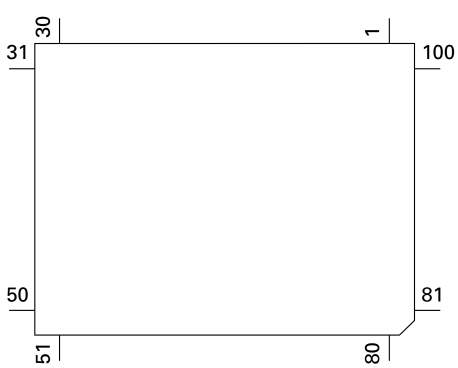
* BR9010FV-W



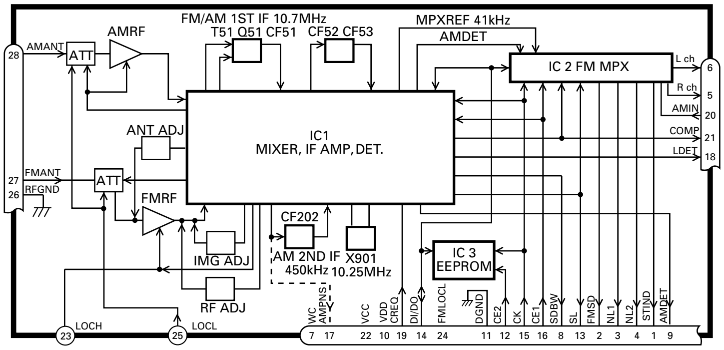
Pin Functions (LC75813E)

Pin No.	Pin Name	I/O	Function and Operation
1	CL	I	Clock input
2	DI	I	Data input
3-89	S1-S87	O	Segment output
90-92	COM3-COM1	O	Common output
93	VDD		Logic section power supply terminal
94	VLCD		LCD driver section power supply terminal
95	VLCD1		2/3 VLCD terminal
96	VLCD2		1/3 VLCD terminal
97	VSS		GND
98	OSC		Oscillating element connection terminal
99	$\overline{\text{INH}}$	I	LCD driver inhibit input
100	CE	I	LCD driver chip enable input

* LC75813E



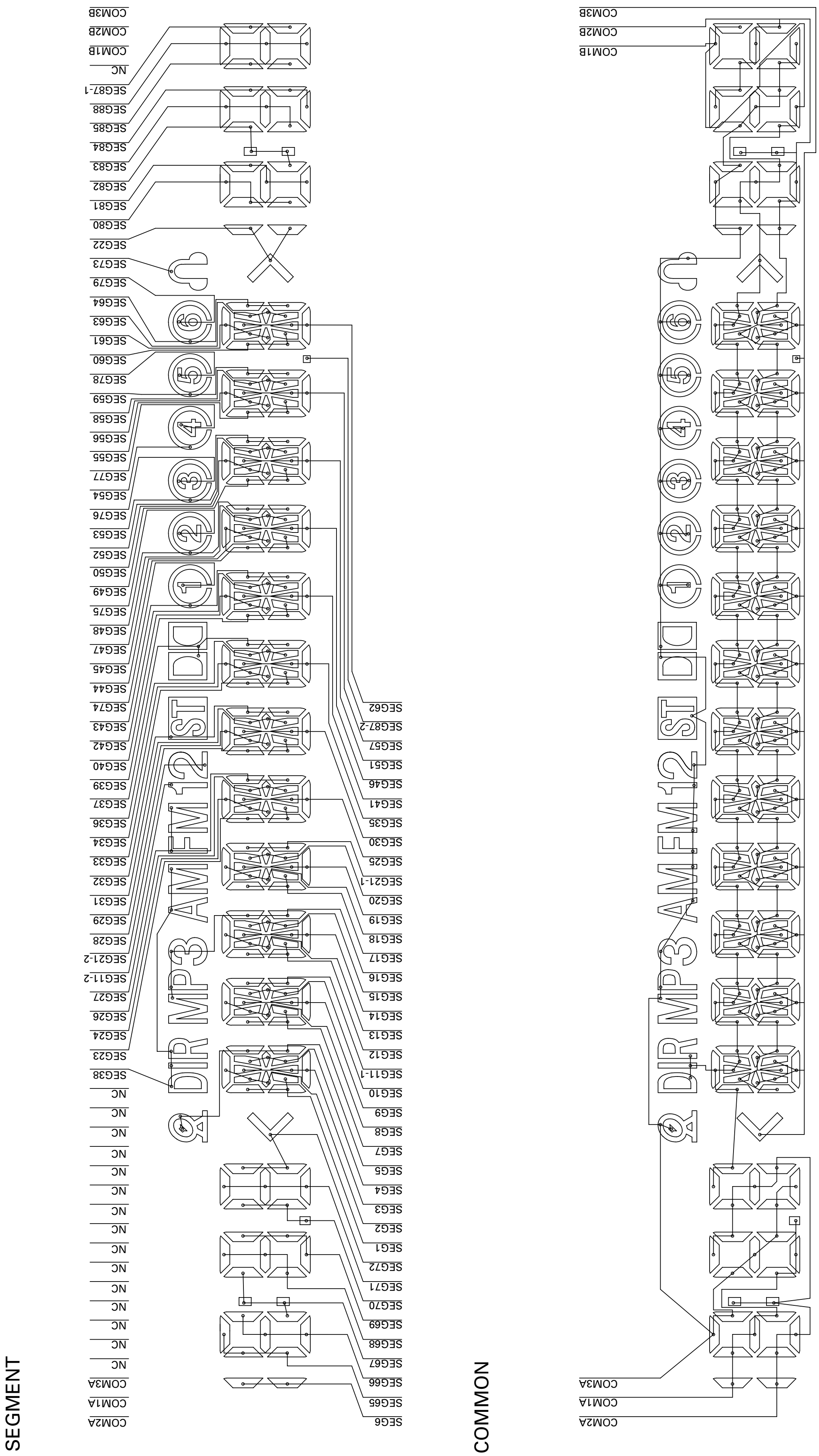
● FM/AM Tuner Unit



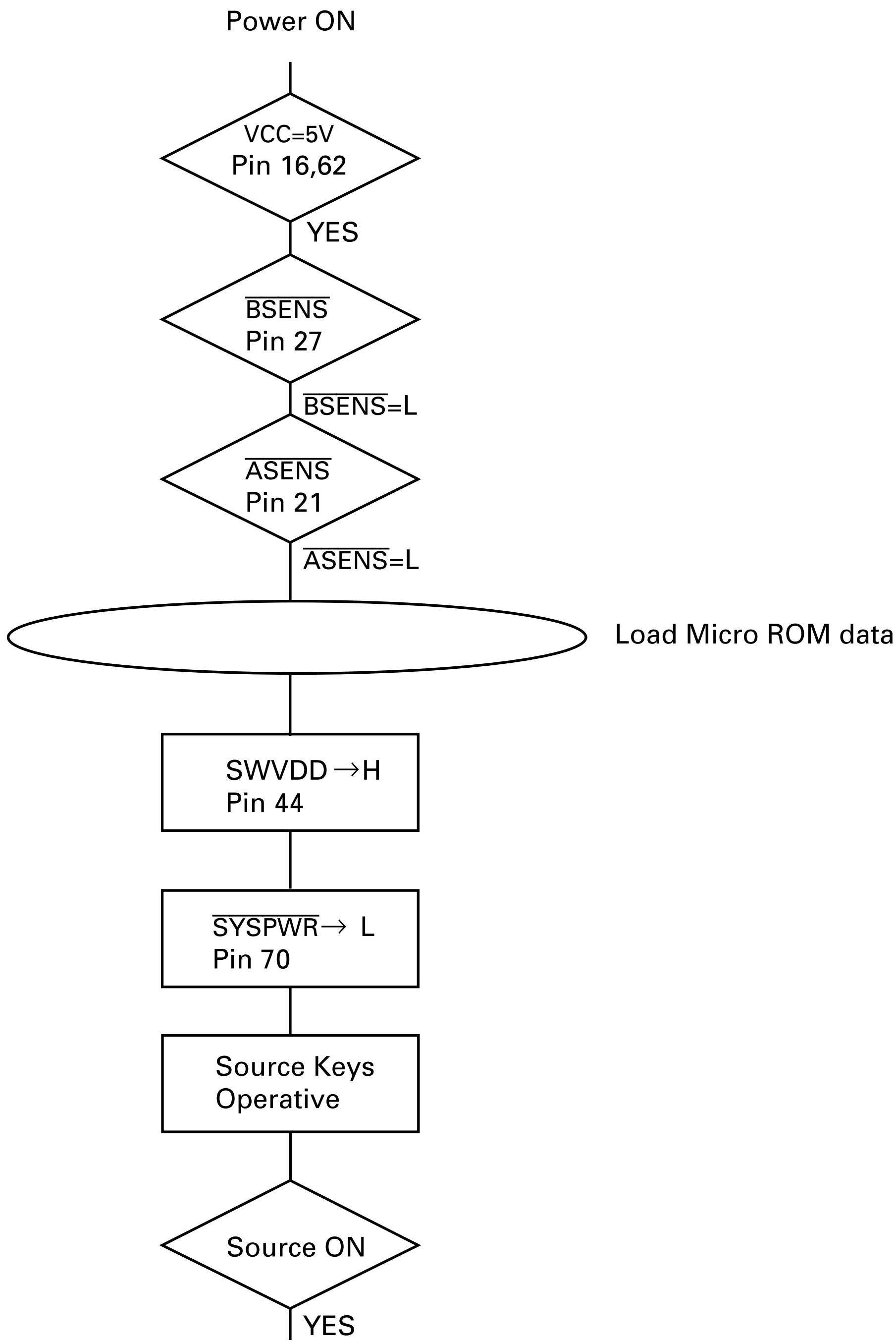
No.	Symbol	I/O	Explain	
1	STIND	O	stereo indicator	"Low" when the FM stereo signals are received. To be pulled up to the "VDD" at 47kΩ.
2	FMSD	O	FM station detector	"High" when signals are received. To be pulled up to the "VDD" at 47kΩ Meanwhile, 10kΩ should be used when taking diver FIX trigger from here and "High: 0.9VDD or more" and "Low: 250mV or less". (Should satisfy the diver IC specifications)
3	NL1	O	noise level-1	"High" when noise is received. Output for the RDS. GND at 47kΩ//1,800pF.
4	NL2	O	noise level-2	"High" when noise is received. Output for the RDS. GND at 36kΩ//330pF.
5	Rch	O	R channel output	FM stereo "R-ch" signal output or AM audio output. Add the specified de-emphasis constant.
6	Lch	O	L channel output	FM stereo "L-ch" signal output or AM audio output. Add the specified de-emphasis constant.
7	WC		write control	EEPROM write control. Writing permissible at "Low". Normally open.
8	SDBW	O	SD bandwidth	SD bandwidth signal output. For detection of detuning data for the RDS.
9	AMDET	O	AM detector output	AM detector output. r out < 100Ω
10	VDD		power supply	Power supply pin for the digital section. DC 5V +/- 0.25V. Be careful about overlapping noise in the logic section.
11	DGND		digital ground	Grounding for the digital section.
12	CE2	I	chip enable-2	EEPROM chip enable. Active a "Low" To be pulled up to the "VDD" at 47kΩ
13	SL	I/O	signal level	Received FM/AM signal level (strength) output. Connect the specified load resistor and capacitor (10k Ω+ 39k Ω//4,700pF)
14	DI/DO	I/O	data input/ data output	Data input/Data output To be pulled up to the "VDD" at 47kΩ
15	CK	I	clock	Clock input To be pulled up to the "VDD" at 47kΩ
16	CE1	I	chip enable-1	AF·RF chip enable. Active at "High"To be grounded at 47kΩ
17	AMPNS	O	AM PNS IF signal	IF signal output for AM PNS circuit.
18	LDET	O	lock detector	Active at "Low". To be pulled up to the "VDD" at 47kΩ
19	CREQ	I	current request	Active at "Low". To be grounded at 47kΩ
20	AMINI		AM audio input	The frequency response and the level are set by connecting an external CR network with terminal AMIN as terminal AMDET. r in = 50kΩ
21	COMP	O	composite signal	FM composite signal output. r out < 100Ω
22	VCC		power supply	Analog section power supply pin.DC 8.4V +/- 0.3V
23	LOCH	I	local high	FM local high pin. When seeking local high, apply 5V together with "LOCL".
24	FMLOCL	I	FM local low	FM local low pin. When seeking local low, apply 5V to the base of the NPN transistor with which the specified resistor is being connected to the emitter. Keep it open in case of ordinary marketed models.
25	LOCL	I	local low	FM/AM local low pin. When seeking local low, apply 5V to the base of the NPN transistor.Since this pin is exclusive for AM when the FMLOCL is in use, do not drive it under FM.
26	RFGND		RF ground	Grounding for the antenna section.
27	FMANT	I	FM antenna input	FM antenna input. 75Ω. Surge absorber (DSP-201M-S00B) is necessary.
28	AMANT	I	AM antenna input	AM antenna input. High impedance. Connect to the antenna through an L (LAU type) of 4.7μH.To cope with the power transmission line hums, insert a series circuit consisting of an L (a coil of about 100mH) + R (a resistor of 470 Ω to 2.2kΩ) between the GND.

7.2.2 DISPLAY

● LCD(CAW1822)



7.3 OPERATIONAL FLOW CHART



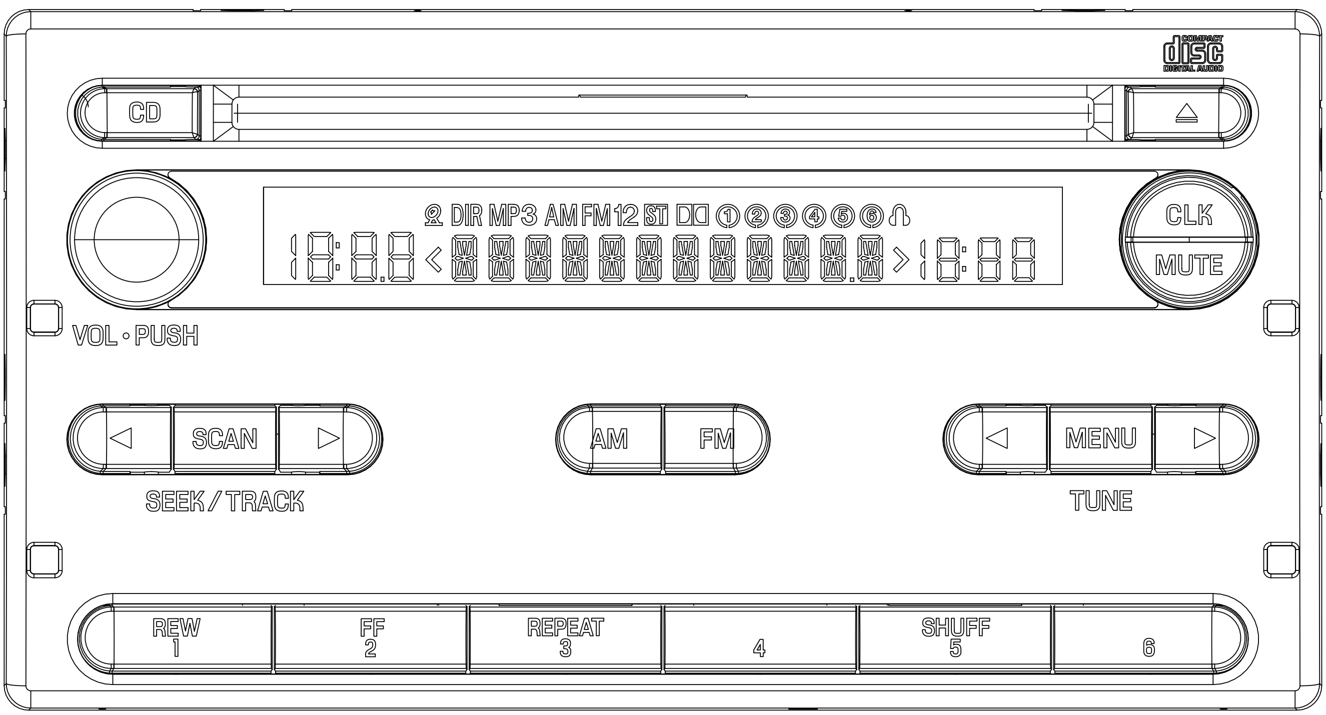
Completes power-on operation.
(After that, proceed to each source operation)

7.4 CLEANING

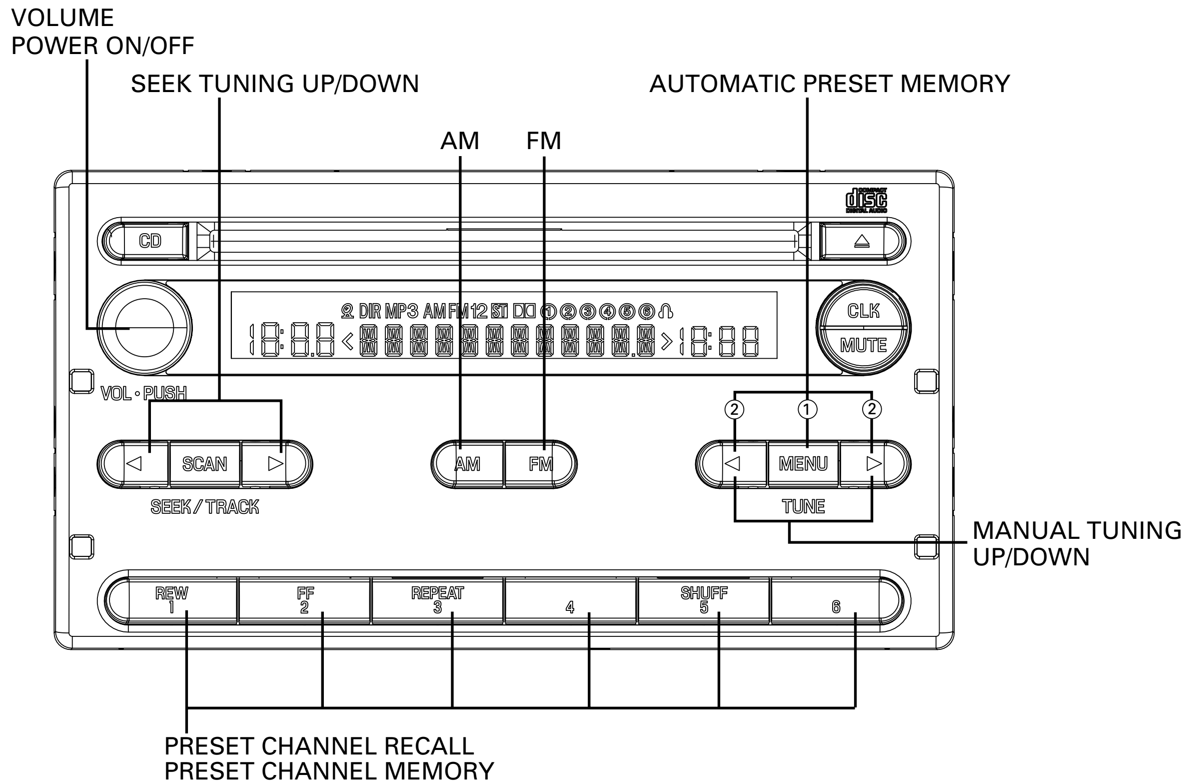
Before shipping out the product, be sure to clean the following portions by using the prescribed cleaning tools:

Portions to be cleaned	Cleaning tools
CD pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008

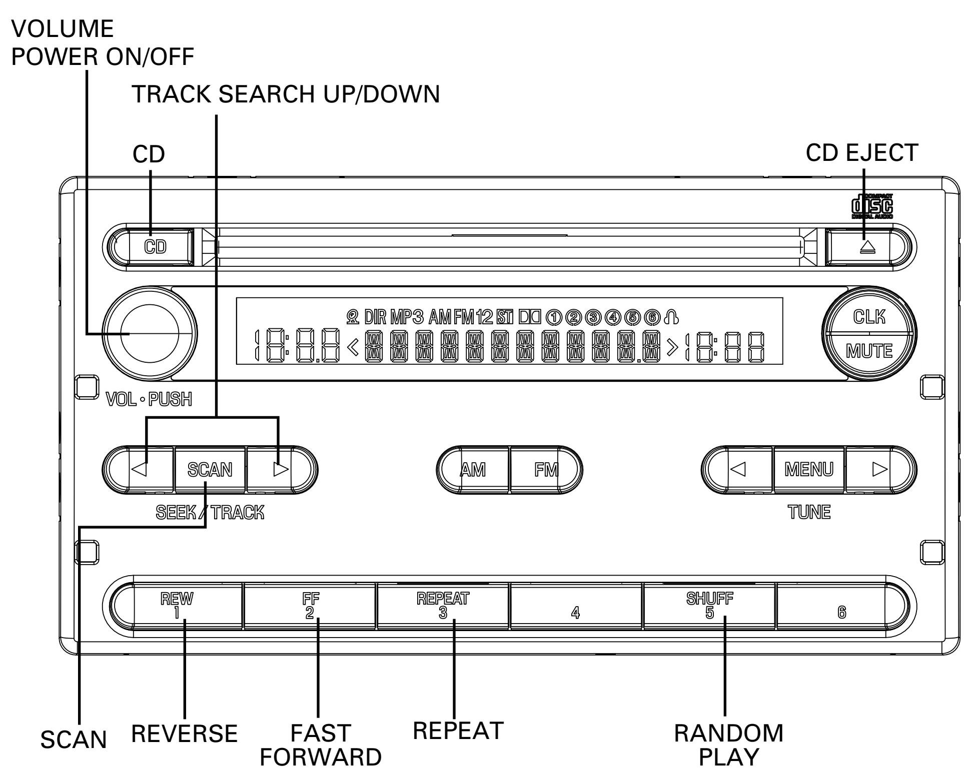
8. OPERATIONS



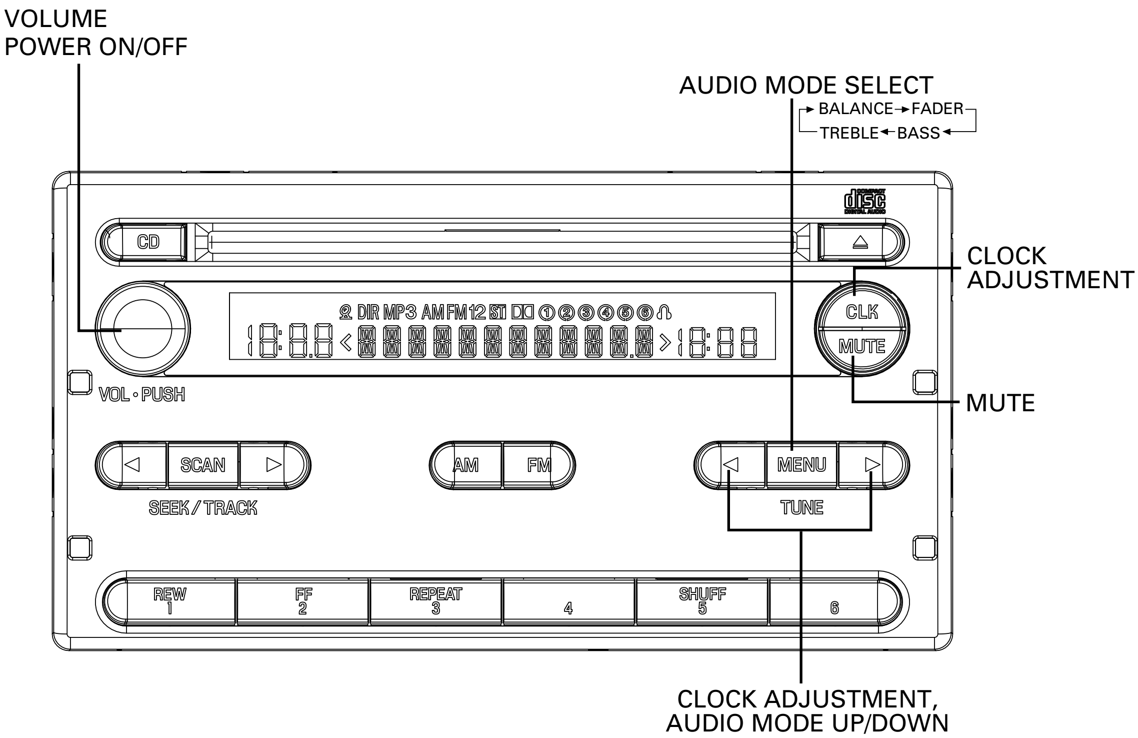
● RADIO


VOLUME
POWER ON/OFF
SEEK TUNING UP/DOWN
AUTOMATIC PRESET MEMORY
AM
FM
CD
CLK
MUTE
VOL • PUSH
SCAN
SEEK / TRACK
MENU
TUNE
MANUAL TUNING
UP/DOWN
REW
1
FF
2
REPEAT
3
4
SHUFF
5
6
PRESET CHANNEL RECALL
PRESET CHANNEL MEMORY

● CD


VOLUME
POWER ON/OFF
TRACK SEARCH UP/DOWN
CD
CD EJECT
CLK
MUTE
VOL • PUSH
SCAN
SEEK / TRACK
AM
FM
MENU
TUNE
REW
1
FF
2
REPEAT
3
4
SHUFF
5
6
SCAN
REVERSE
FAST
FORWARD
REPEAT
RANDOM
PLAY

● AUDIO



VOLUME
POWER ON/OFF
AUDIO MODE SELECT
BALANCE
FADER
TREBLE
BASS
CLOCK ADJUSTMENT
MUTE
CLOCK ADJUSTMENT,
AUDIO MODE UP/DOWN
CD
VOL • PUSH
CLK
MUTE
SCAN
SEEK / TRACK
AM
FM
MENU
TUNE
REW
1
FF
2
REPEAT
3
4
SHUFF
5
6